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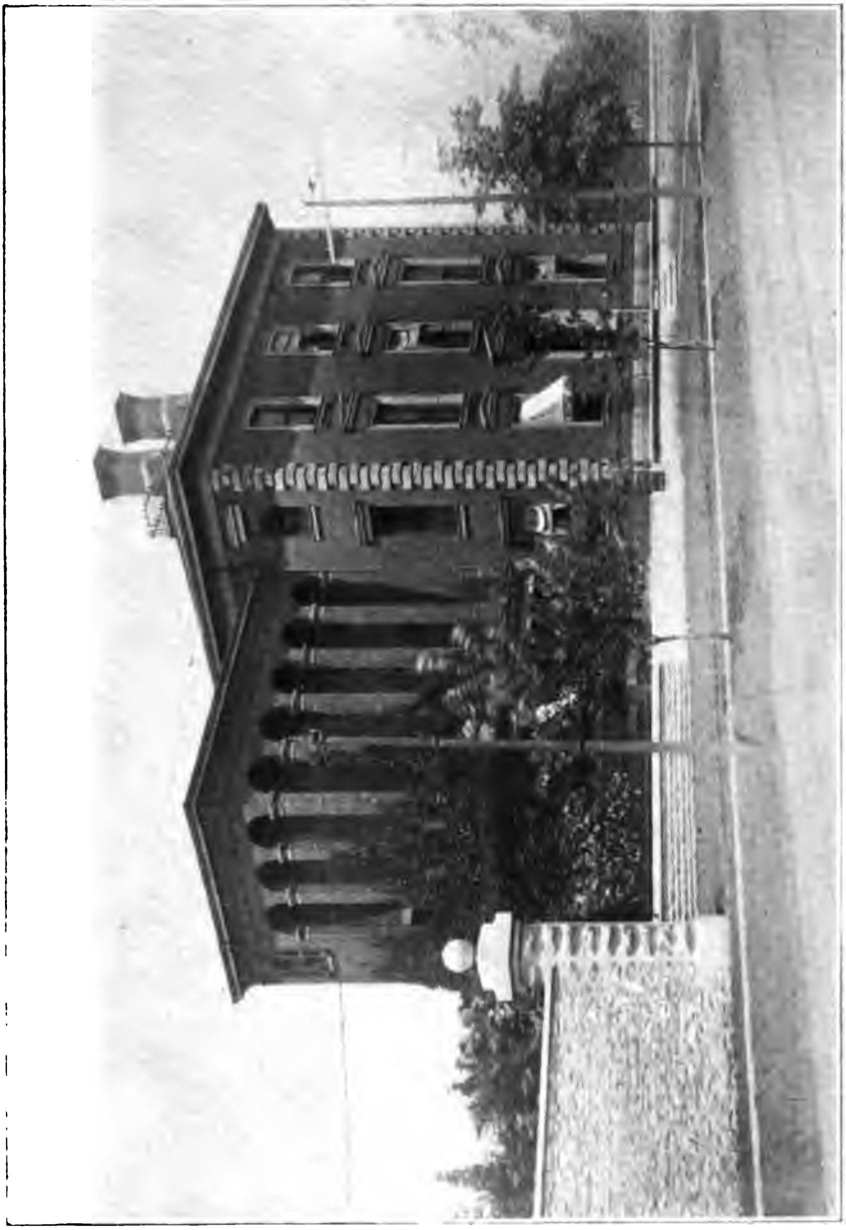

Directors' Residence, Missouri Botanical Garden.

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SOME AMERICAN BOTANICAL GARDENS.

I. THE MISSOURI BOTANICAL GARDEN.

By Director William Trelease.

IN 1849, Henry Shaw, a middle-aged retired hardware merchant of St. Louis, with a fondness for flowers, built a country residence four miles southwest of the St. Louis court-house, and laid out about it a little garden, the inspiration for which he had while visiting the Chatsworth Gardens, in England, a few years before. Here he entertained his friends and welcomed strangers, and one of the pleasant trips out from St. Louis soon came to be that to Shaw's Garden. About the middle of the next decade, Mr. Shaw came in touch, through Engelmann, with the two Hookers, and, having the intention of enlarging his garden, he conceived that it would be well to make of it at once a place of beauty and an establishment affording facilities for scientific work, so that when the extension was made, the collection of plants was largely augmented, certain systematic features were introduced, a small library, herbarium and museum building was erected, and, under Engelmann's guidance, stocked with a good collection of books and certain important herbaria, among them a local collection by Riehl and the herbarium of the recently deceased Professor Bernhardi, of Erfurt, while over the gateway of the establishment he placed the name, "The Missouri Botanical Garden." At about this time, temporary and legislative provision was made for the settlement of his property upon the Missouri Botanical Garden when his death should come. Mr. Shaw, however, lived for thirty years after this extension of the Garden was made, and in his later years conceived and executed a plan for endowing a department of botany, now known as the Henry Shaw School of Botany, in Washington University, his will further making the connection between the School of Botany and the Garden most intimate, although they remain under totally separate management.

As now constituted, the Garden is under the control of a Board of Trustees, of whom some, men interested in science, education and municipal affairs, are members ex-officio, while a majority are either those designated by Mr. Shaw, or their successors appointed, under the terms of his will, by the Board. In 1885, when the Henry Shaw School of Botany was founded, the writer was invited by the University authorities, in consultation with Mr. Shaw and Professor Gray, to become its Director, and on the death of Mr. Shaw, in 1889, the direction of the Garden was further entrusted to him.

The Garden, as now improved, includes approximately forty-five acres, devoted to a formal flower garden, various synopses of botanical or economical significance, a fruticetum, an arboretum, and a moderate-sized range of houses, some of old model and others of recent construction in accordance with the present practice in plant-house building. The planting in these divisions the Garden is in part formal, in part natural, and, while the transitions are not always satisfactory, the extreme representations of the two methods are fairly successful. In the plant-houses, in addition to ranges furnished with staging, which is best suited to the growth and display of certain kinds of plants, other ranges are devoted to representative collections of a homogeneous character, planted out in as natural a way as may be. There are, for instance, a fern house, a tree-fern tower, an acacia house, a yucca tower, and a cactus house, in which the impression produceable by each of these classes of plants is accentuated by the natural manner in which they are grown.

Within the last year, some twenty additional acres of ground adjacent to the original Garden have been graded, provided with drainage and water supply, and in large part planted with the necessary trees and shrubs, the purpose being to make of this tract a synopsis of the North American flora, arranged in the well known, if passing, sequence of families of Bentham and Hooker. Within the next few years, this synoptical tract will further be improved by the making of the necessary walks and the definite arrangement of the herbaceous portion of the synopsis, which will comprise, in all, some 1850 species, exclusively of North American nativity and representing as large a range of genera and families as conditions permit. Contiguous to this tract and the present arboretum lies some sixty acres of additional ground, plans for the improvement of which are now well advanced, and it is proposed that this tract shall be planted with a collection of trees, shrubs and herbaceous plants, representing the natural families of Pteridophytes and flowering plants, as comprised in the flora of the world, so far as this is possible under existing conditions. This collection, unlike the other, will be arranged approximately in the phylogenetic sequence of the newer school, as represented, for instance, by the publications of Engler and Prentl, and North American species will be admitted only when families can be represented in no other way. Both of these tracts are being improved under landscape plans of the Olmsteds, the intention being that while each is a complete synopsis in itself, the two shall blend together and blend with the older part of the Garden in a harmonious way.

Mr. Shaw, from the inception of the botanical garden idea for his garden, contemplated provision for the giving of instruction. In addition to the facilities for instruction in pure botany afforded by the endowment of the School of Botany and its close connection with the Garden, there was a provision in his will that instruction should be given to garden pupils, and a symmetrical four years' course of theoretical and practical work, covering the various branches of gardening, has long been in operation at the Garden, and is each year turning out a small number of men who are taking rank in the gardening profession, some going to the offices of landscape firms, others to the practical or instructional departments of agricultural colleges, others engaging directly in the work of professional florists, and others becoming gardeners in private or botanical establishments, or in parks.

For research purposes, the effort has been to primarily secure foundation facilities. Between nine and ten thousand named species or varieties of plants are annually grown in the Garden, affording a large range of material from which to select plants for investigation of the most varied kind. The herbarium has grown to about 350,000 incorporated sheets of specimens, and some 50,000 others are awaiting incorporation. The scientific value of the collections of both living and dried plants may be gathered from the statement that the former contains much material derived from Engelmann and representing the original sources of many of his conclusions on cacti, agaves, yuccas, etc., as well as the living material on which important investigations have been made at the Garden within recent years, the living type collections of cacti of Mrs. Katharine Brandegee, etc.; while the latter contains the herbaria of Bernhardi, Engelmann, Redfield, Chapman, Jorr, Jermy, Riehl and others who have done work of either local or general value, as well as large numbers of types and other material subjected to recent critical examination by the Garden staff or other botanists.

The library, which now comprises some 15,000 volumes and 19,800 pamphlets, is especially rich in the earlier authors' separates derived from the Engelmann library and other sources, and in sets of long series journals and proceedings of societies, and a unique feature of it is a collection of some 600 volumes published prior to the time of Linnaeus, presented in large part by the late E. L. Sturtevant.

Up to the present time, the revenue available for the maintenance of the Garden, which is derived entirely from real estate bequeathed by Mr. Shaw, has permitted of only the maintenance of the establishment, the policy of the Director and Trustees, however, being to consider evident, if small, annual growth as a necessary index of proper maintenance, and the result has been the accumulation of the research facilities noted above. There is reason to believe that within a comparatively few years, because of certain changes attending the real estate investments, the money available for the uses of the Garden will be increased by a sum of $50,000 or more annually, and it is expected that with this increase in available revenue the Garden will not only add to its floricultural attractions, among which no small item will be a range of palm and other houses, which will be planted in such a way as to continue the effects begun in the present ranges, but that a creditable museum will be installed, and that the maintenance force about the office, consisting now of one botanical, one horticultural and two library assistants, in addition to the Director and his amanuensis, will be increased by the addition of young men expert in the several branches of botany, so that it is confidently believed that the next quarter of a century will see at the Missouri Botanical Garden a staff of investigators of standing, devoting a part of their time to the necessary maintenance routine of the establishment, but giving a part of their time to investigations in all of the branches of botany. At present the work being done is largely that dictated by the present maintenance needs of the Garden, namely, along systematic or economic lines, but the scope of Mr. Shaw's purpose and the judgment of the Director and Trustees is broad enough to prevent any limitation other than that dictated by the terms botany and gardening, in the broadest sense, and by the available maintenance funds.

A VISIT TO THE ROYAL PALM HAMMOCK OF FLORIDA.

By Charles T. Simpson.

IN the month of April, 1885, in company with Mrs. Simpson and Mr. Pliny Reasoner, of Braidentown, Florida, I made a cruise down the coast of Florida, from Tampa Bay to Cape Sable, along the lower Keys to Tortugas, and back to Tampa Bay. The sharpie in which we made the passage was in command of Captain Culbert, a well-known character on the west coast of Florida. The object of the trip was to collect shells and marine life, to study the botany of

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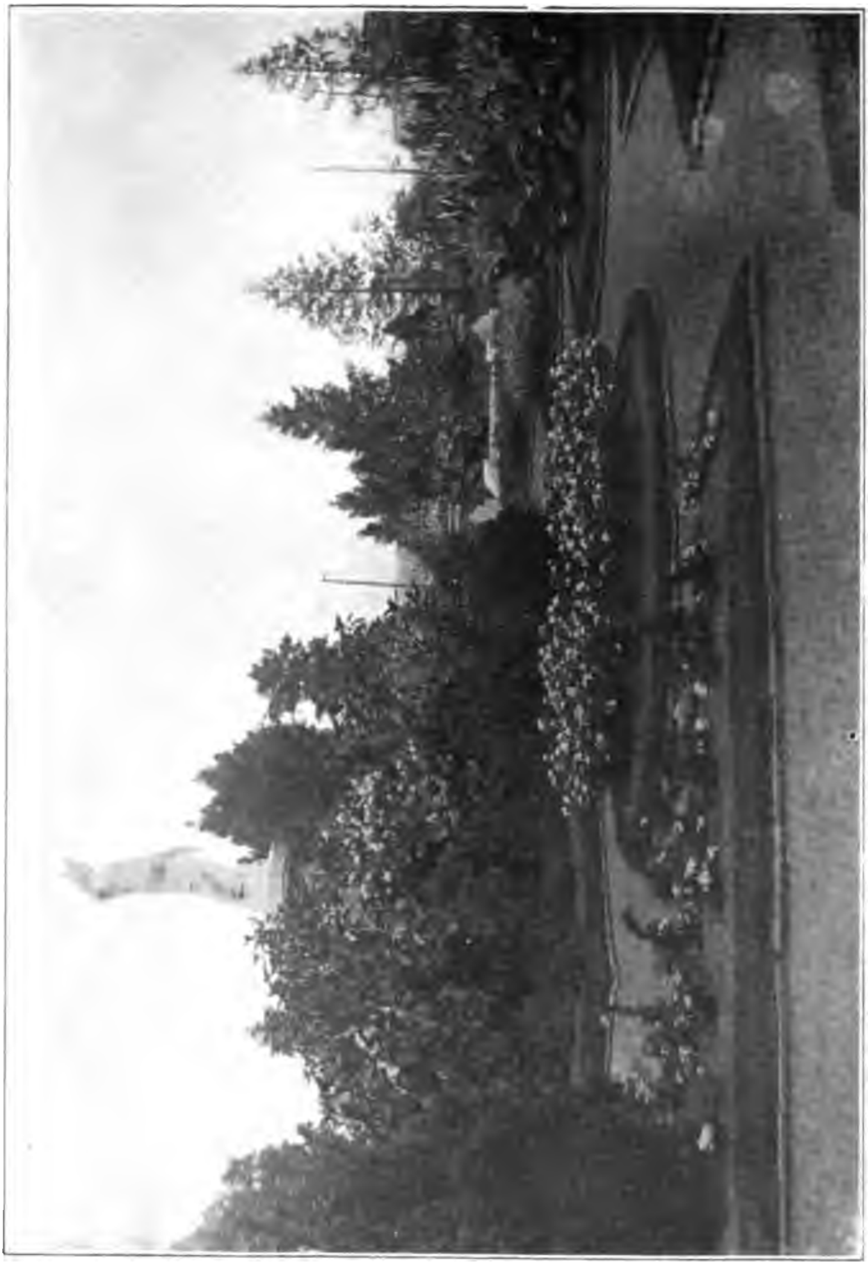


Herbaceous Grounds, Missouri Botanical Garden.

the region, my friend Mr. Reasoner making a collection of plants for his nursery at Oneco, Florida.

On our way down we ran up Roger's River, just north of Cape Sable, as far as Evans' Plantation, where there were quite a number of royal palms (*Oreodoxa regia*), growing along the banks of the stream A good many specimens of *Auricula pellucens*, an air-breathing mollusk living in brackish swamps, were picked up about the roots of these trees, and it is quite probable that the low ground on which they stood is occasionally submerged with brackish water in the time of unusually high tides. These palms, though healthy and vigorous, were not numerous, and were generally of small size, none exceeding, I should think, 50 feet in height.

On our return trip we stopped in at Goodland Point, back of Cape Romain, where we secured the services of a Mr. Johnson, a fine, intelligent, magnificently developed man, to act as guide and boatman for a trip to the royal palm hammock, some six or seven miles back from the coast. Mr. Reasoner, Mr. Johnson and I started early the next morning in a row boat, passing for the first few miles through a labyrinth of narrow and wide, crooked channels, among which the tide ran sometimes with us and as often against us. These passages ran between low, mangrove-covered islets, for this was the Ten Thousand Islands, and the name is most appropriately bestowed. These low islets were everywhere clothed with a dense growth of mangroves standing high out of the mud on their long, stilted, curved roots, reminding one of some strange kind of spider. The channels were filled with coon oysters, often to such an extent that we could only get the boat through them with the greatest difficulty, and in many places they covered the loose air roots of the mangroves, forming bunches of a bushel or more, arresting the growth of the roots and swinging free in the tide. The water was of a dirty beer color, and everywhere there was that foul, sickening odor found only in a mangrove swamp. Mosquitoes swarmed, even in the middle of the day, in every spot except the open sunlight, so that the region was one of the most gruesome and dreary I had ever been in. Here and there we saw an island a little more elevated than the rest, sometimes having on it a great shell heap. On these there were Mastic (*Sideroxylon pallidum*), Jamaica Dogwood (*Piscidia erythrina*), Gumbo Limbo (*Bursera gummifera*), the Star Apple (*Chrysophyllum olivaeforme*), Cabbage Palmetto (*Sabal palmetto*), with a variety of shrubs and creepers, and on one or two of these were signs of clearing and cultivation. Some of them were more or less overrun in places with a *Cereus* (*C. pitajaya?*) three, four, or five angled, which sometimes stood erect, but oftener scrambled over the low trees and undergrowth, now half climbing and again falling to the ground and taking root only to rise again.

We had made a very intimate acquaintance with it and its villainous spines, which will run through the stoutest cowhide shoe, while collecting tree snails at Goodland Point and other places along the lower coast.

Later on the face of the country changed somewhat. There was more land—or mud—and less water, and soon we came to and entered one of the canals common to that region, which are, no doubt, the work of a prehistoric race. They were perfectly straight, only a few feet in width, and still showed the earth on either bank that had been excavated when they were dug. They were so overgrown with mangroves that it was a difficult matter to get our boat through. To accomplish this I laid down in the bow and guided it as well as I could between the roots. Reasoner and Johnson poled it along with short poles, which had been brought for that purpose. We passed from one canal into a natural, crooked waterway, then into another canal, and so on until our guide seemed to be bewildered, and finally acknowledged that he was lost. We turned back, for we could not turn around among the roots, and worked our way to an opening we had passed some time before. This we entered, and traversed a long, crooked passage, finally coming out into a sort of open basin. Johnson thought we had reached our journey's end, but decided, after examining the shore, that we were in the wrong place, so we turned back, and after threading other intricate waterways we entered a second almost circular basin. We landed on the muddy shore, among a tangle of mangroves, and, pushing through a sort of opening cut out among their roots, we came out within a few rods on the edge of a low, half-submerged prairie, and there before our eyes was a sight well worth going a thousand miles to see.

The prairie was less than a quarter of a mile wide and had been partly burned over before. Scattered thickly over it were the great globular shells of the Idol Snail (*Ampullaria depressa*), an inhabitant of the fresh waters of Florida. Beyond the prairie there rose an almost solid wall of rich, evergreen tropical forest, and everywhere among it, towering far above the other trees, were magnificent pluming royal palms, singly, in twos and threes, and in clusters. There was not a breath of air in the thick scrub where we stood, but we could see the leaves of these majestic trees tossing in the strong sea breeze, and now and then the straight trunks swayed over under its influence. Reasoner and I took off our hats and stood silent and awed before the glorious sight. They were no more beautiful or majestic than hundreds of other similar trees I had seen in Central America, but it thrilled me with a feeling of patriotic pride to see such a forest of this superb palm actually growing indigenous in the soil of the United States. It stretched to the northward as far as we could see, and Johnson informed us that there were believed to be about 500 trees in all.

Aquatic Pool and Arboretum, Missouri Botanical Garden.

Without attempting to discuss the mooted question as to what the true *Oreodoxa regia* is, whether these belong to that species or not, or whether the *O. regia* and *oleracea* are the same, I will say that these were very lofty trees, with straight, moderately smooth, gray stems, having much the appearance of palms I had seen in the Bay Islands and Spanish Honduras. The royal palms I have since seen in Jamaica and Haiti seem more delicate, and to have whiter, smoother stems. None of the West Indian trees I had seen excelled 80 feet in height; many of these were certainly a hundred or more. Mr. Frank Budge, of Miami, Florida, has recently visited this hammock and measured one of these trees, which, I believe, reached a height of 125 feet, and the botanist, A. H. Curtiss, who was there before I was, made a somewhat similar measurement.

We had but little time for exploration, for it was past midday when we reached the hammock; we had no means of camping on the spot, and we would have been hopelessly lost had we attempted to return after dark. Mr. Reasoner obtained several fine orchids, which he had not seen elsewhere, among them *Epidendrum nocturnum*, *E. rigidum*, and the wonderful *Dendrophylax lindeni*. The last grew on the trunks of the royal palms, sending out from a common centre a number of long, fleshy, wavy roots, which clung closely, and it seemed to me lovingly, to the gray bark of the tree. It had no leaves, but from the centre there sprung several slender branched stalks, each branch having a large, lovely, satiny flower. I had seen this same orchid on the same tree in Honduras, and so far as I know, it grows nowhere else than as an epiphyte on the trunks of royal palms. How did it come to be on the stems of these palms in Florida? There can be no reasonable doubt, I think, that most of the indigenous tropical vegetation of South Florida and the Keys has been transported from the West Indies and the Spanish Main by the ocean, their seeds, and, possibly, in some instances, living plants being borne northward on the Gulf Stream and landed by winds and storms on the Florida coast. The seeds of the royal palm are about the size of grapes, and might probably be carried in this way. But those of the *Dendrophylax* are small, and would probably perish in a long sea passage. If it was possible that a living royal palm, with the orchids growing on it, might be transplanted to the shores of Florida by means of currents and streams, it is probable that the latter would perish from long immersion in salt water. If the orchid seeds were by any means carried separately, how could they reach the trunks of living palms after their arrival? At any rate, there they were, and there seemed to us to be something almost like human love and affection in their having made this long sea voyage to be with and cling to the trunk of this noble palm.

PLANT AGENCIES IN THE FORMATION OF THE FLORIDA KEYS.

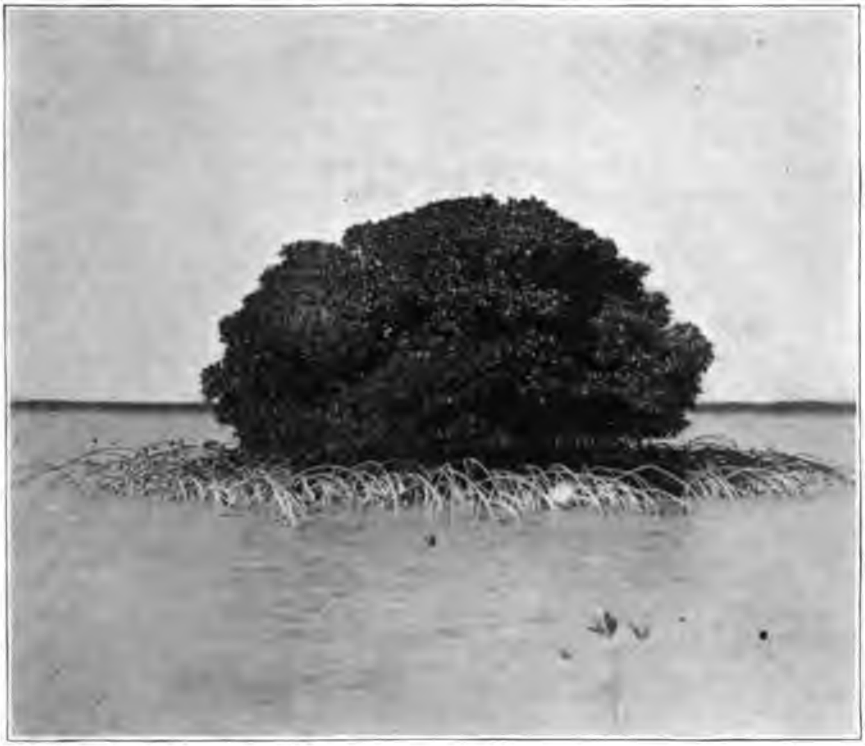
By Charles Louis Pollard.

THE long chain of coral islands popularly known as the Florida Keys extends in a southwesterly direction from a point near the head of Biscayne Bay, in more or less close conformity with the coast line as far as Cape Sable, and thence extending at a tangent to the westward, terminating in the cluster of small keys known as the Dry Tortugas. Most of the larger islands, such as Key West, Sugar Loaf, and Largo, lie near the center of this chain, the outlying westerly groups being small and scattered, while the eastern ones are less numerous and form practically a single series. The name "Key West" is thus, strictly speaking, inapplicable, but at the time of its discovery by Spanish wreckers and pirates the island was called "Cayo huesco," probably on the assumption that it was the westermost extremity of the chain. Key West was not occupied by American settlers until the early part of the last century.

The Keys represent elevated portions of one continuous coral reef, about 200 miles in length, the south side of which is washed by the waters of the Gulf Stream flowing through the Florida straits. This reef contains numerous depressions affording navigable channels to sailing vessels passing from island to island; frequently, however, it presents large areas of fairly level surface covered at low tide with scarcely more than a foot of water, and quite impassable even for a small boat. It is therefore difficult to map out a course for a steamer of any size, although between the southern line of the reef and the island chain there is a clear channel, used by the steamer plying between Key West and Miami. This channel, being landlocked by the islands on the north and the reef on the south, is clear and quiet, presenting a startling contrast with the turbulent waters of the Florida straits on the other side of the reef.

While the coral polyp is naturally the active agent in reef construction, yet the building up of habitable islands thereon is due almost entirely to plant factors, the most important of which is the mangrove (*Rhizophora Mangle*) and its allies. The actual sea area annually reclaimed by the growth of this remarkable plant would no doubt be surprising if it could be correctly computed. Some explanation of the means whereby this is accomplished may not be inappropriate while discussing the general topic of island formation.

The seed of the mangrove germinates within the persistent pericarp while the fruit is still attached to the tree, and the radicle often attains a considerable length, occasionally even penetrating the soil before it



The Mangrove (*Rhizophora Mangle*). After photograph by Mr. G. N. Collins, at Salt Pond Key, Florida.

becomes detached from the parent. The young plants thus formed grow rapidly and soon are able to continue the reproductive process. In addition to this method of development the plant emits numerous aerial roots from all parts of the main branches; these roots elongate rapidly, and attach themselves by rootlets as soon as the apex penetrates solid ground, whether above or beneath the surface of the water. If the depth of the latter exceeds a foot, the roots usually branch, and thus serve to support the plant in its progressive march seaward. The seeds retain their vitality after long immersion in salt water; and the projecting radicle very soon secures attachment upon a small portion of the reef that has been exposed at low tide. Here, then, is the beginning of an island; as soon as the plant has gained sufficient size to produce aerial roots, flowers and fruits, the formation of a thicket ensues with surprising rapidity, even though the inchoate island may yet be partly submerged at high water. Many of the smaller keys are still in this initial stage of formation, consisting of from one to several acres of mangrove thickets, with no other vegetation and but little solid ground beneath.

This intertwining mass of stems cannot fail to arrest and hold a large amount of tidal drift, consisting of decaying algæ, sponges and hydroids, fragments of the reef, shells, etc.; and this organic matter, as it decomposes and becomes amalgamated, affords a rich culture medium for the seeds of other plants which ultimately secure lodgment on the islet. The black buttonwood (*Laguncularia racemosa*), and the white buttonwood (*Conocarpus erecta*), two shrubs belonging to the Combretaceae, and having a habit similar to the mangrove, soon establish themselves, and by their annual contribution of dead leaves and twigs the interior of the island is built up so that it gradually dries out. Under these conditions another type of vegetation begins to thrive, and ultimately the interior of the island is converted to "hammock" land. The mangrove thicket, it must be remembered, is continually enlarging around the shore line, as the roots push further into water, while it simultaneously dies out in the interior. Thus the area of a small key increases wonderfully within a few years, so that it is difficult to preserve absolute accuracy in maps of this region. There are many islands whose dimensions at the present time are almost sufficient to warrant the establishment of plantations, that are entirely omitted from the older charts, or are indicated merely as shoals.

As might be expected, the soil constituents are similar on all the keys, disintegrated coral rock forming the basis of all soils, the admixture of humus varying in proportion to the extent of vegetation and the elevation above tide water. Although the depth of soil, even in the best plantations, is inconsiderable, it reaches a maximum of fertility owing to the large proportion of lime salts combined with the natural leaf mold. The land is not usually susceptible of cultivation by ordinary implements, since it is covered with fragments of rock and intersected by numerous outcropping ridges; but the soil is extremely variable, owing to the absence of clay, and thus requires neither plowing nor harrowing. It is a source of surprise to northern visitors that such vegetables as tomatoes and egg plants, which in our latitude require careful cultivation in well-manured ground to produce the best results, thrive with little or no attention on the keys. Sturdy individuals, well laden with fruit, may frequently be seen growing from a crevice in the rock containing apparently only a cupful of soil. Of course, the climate is an important factor in the plant development on these islands, and it is not so much the increased mean annual temperature as the uniformity of the latter that promotes luxuriance of growth. The region is practically rainless during the late winter and early spring months, and on account of the total absence of fresh water streams and any artificial irrigation it would seem that most crops could hardly be productive unless grown at special seasons; yet tomato culture continues the year around, and other garden vegetables may be grown with equal ease, while the pineapple affords at least two crops in a season. The only necessary operation in cultivation is to keep the ground free of weeds, and in many plantations not even this precaution is taken.

With such natural facilities the development of the islands as a market gardening section would be very rapid if it were not for the fatal obstacle of inaccessibility. Fruits and vegetables must be transported in sailing vessels to Key West or Miami, and from either point the distance by steamer or fast freight to northern parts is far too great for perishable produce. Even this difficulty, however, may be surmounted in time, and the plantations on these islands could then compete with the best truck farms on the adjacent peninsula.

Southern France has long been known as well adapted to the growth of plants for the manufacturing of perfumery and essence. The centre of this industry is in the regions about Nice, Grosse and Cannes, where there is grown and treated annually about 2,500,000 kilograms of orange blossoms, 3,000,000 kilograms of roses, 200,000 kilograms of jasmine, and 150,000 kilograms each of violets, acacia, and tuberoses, besides several thousand kilograms of geranium, mint, balm-mint, jonquils, mignonette, verbena, lavender, thyme, rosemary, etc.

BRIEFER ARTICLES.

VARIATION IN TRILLIUM FLOWERS.

The variations in *Trillium grandiflorum* noted by Mr. Holsinger in the July number, and by Mr. Pollard in the November number of this magazine, suggests a further modification, which I have noticed in the vicinity of Buffalo, and which, so far as I know, has not been put into print. Where the petal of the flower shows a tendency to revert to a leafy or bract form and shows a stripe of green, or, as in many cases, becomes entirely green, the leaf blade diminishes in size, and both petiole and peduncle become lengthened. In some cases the peduncle is considerably longer than the whole stem below the leaf whorl. In others the petiole would be from 4 to 6 inches in length, with a narrow lanceolate blade, about 3 inches long. The green-petalled variety is common enough here to afford my students in the course of their collecting from 10 to 40 specimens each spring. Multiplication of organs is common, in one case extending not only to the petaloid and bract-like forms, but also to the leaves. *T. erectum* has also furnished a few instances where the whorls are repeated, but none with the lengthening of leaf and flower stems.

IRVING T. BISHOP,
State Normal School, Buffalo, N. Y.

THE NAME "DOG'S-TOOTH VIOLET."

One day late in June, while walking through the woods, in Ross County, Ohio, I came across a patch of *Erythronium Americanum* in fruit. The seed-capsules were still geeen, but were well filled out. As I had never examined the seed of an *Erythronium*, I thought that this would be a good opportunity to do so. The capsule opened readily along one of the sutures, displaying two rows of white, compressed, and slightly curved ovules, pointed at the tip, borne by green placentae, and meeting like two rows of teeth. Holding the capsule in a horizontal position I was struck by their resemblance to the teeth of some tiny carnivorous mammal. Perhaps the thought would not have occurred to me were it not for the way the ovules were set in the placentae, the green color of which contrasted with their pearly whiteness, and suggested the gums of an animal. The pointed teeth overlapped slightly where the two rows met. The common name of the plant then flashed upon my mind. Could it be that "Dog's-tooth" was suggested by their resemblance to the teeth of a dog? Linnaeus undoubtedly took the specific name *dens-canis* from a common name. I looked up the word in a German etymological dictionary. There I found that *der Hundzahn* is a plant growing in warm countries, with *zwiebelartiger, zahnaehnlicher Wurzel.* This was evidently intended as an explanation of the name. The root is indeed *zwiebel-artig*; but I do not think that any stretch of the imagination one could call it *zahn-aehnlich.* On the other hand, it required no suggestion on my part to those who saw my specimens to recognize the resemblance of the seed to animal teeth.

Here, then, it seems to me, is the explanation of the much decried misnomer for the *Erythroniums.* The German name was without the "violet" appended, which in all probability was given to it on account of the nodding flower. June will soon be here again, and those of your readers who are interested in the common names of plants may easily verify my discovery. W. E. SAFFORD.

A WONDERFUL PLANT DOOMED.

The bringing of water to the arid wastes of Arizona and the consequent evolution from desert to garden is causing the extinction of one of the strangest plants in the world. At a recent session of the territorial legislature the *Cereus giganteus*, the great cactus, better known as the saguara and peculiar to the soil of this territory, was made the official flower of Arizona. Not many years will elapse before a new choice will be necessary.

When the first Franciscan fathers journeyed north from Mexico into Arizona they carried back reports of the great cactus which covered the plains of the new country, and told about its food value to the Indians. Now, as the art of the American has reclaimed, foot by foot, the former desert, and the magic water has made orange, peach and apricot orchards and great fields of alfafa, the saguara has been driven out, and only in spots where water cannot be got can the odd plant be found.

On the rocky, gravelly mesas, the saguaras, the largest of the cactus family, point their candelabrum-like arms straight toward the sky, not infrequently reaching a height of sixty feet. The body of the saguara, sometimes two feet in thickness, is composed of thin pieces of porous wood, arranged in the form of a Corinthian column, covered and held together by the outside fibres of pale green. At some distance from the ground large branches put out, while the whole surface is covered with sharp, prickly thorns. A large white, sometimes purple, blossom comes forth early in the spring and ripens into a pear-shaped fruit by the last of June. This fruit, the petahaya, tastes like a mixture of raspberry and fig, and is highly prized by both Indians and Mexicans. Part of the fruit is eaten while ripe, and the rest is dried in the sun or boiled down to a jam.

Until the advent of the missionaries to the Papago Indian tribe, some twenty years ago, the gathering of the saguara was the occasion of the greatest orgy of the year. From the fruit a highly intoxicating beverage was made. With this the Indians drank themselves into a state of frenzied intoxication. During these feasts a number of the braves were frequently killed. The saguara is short-lived, although tradition has given it an age measured by centuries, and usually begins to decay at the base before attaining its growth. Moisture is fatal to it, and as soon as it receives a constant supply of water, decay is rapid.

—PHOENIX CORRESPONDENCE, *New York Sun.*

A FALL FLOWERING VIOLET.

On October 30, I had the rare pleasure of finding a patch of *Viola pinnatifida* in full bloom. The blossoms were larger than I am wont to see, and it seemed to me a trifle paler, but not enough to detract from their beauty. Water had frozen night after night in tubs and small vessels to the thickness of a quarter inch. The blooms were therefore sufficiently astonishing, as they do not venture out in any such weather in the spring. But the leaves were what especially caught my eye and made me careful to preserve the specimens. The spring specimens are divided almost to the base or within two or four lines of it, and subdivided into linear or oblanceolate segments, losing any cordate outline they were designed to have.

These last forms are strongly cordate, divided a little more or less than half way into 3–6 main divisions, the subdivisions amounting in many instances to little more than coarse teeth. Some of the leaves are 25 lines in diameter, flowers 11 lines in length after pressing. In Dr. Britton's Revised Manual, is the first mention I have seen of any such leaves. "Forms occur in which the leaves are merely slighly lobed." This note is written to draw out other experiences. Is it an autumnal form only; or has this form been found at other seasons? I hunted up another patch where I collected the normal form, last May, to see if they were affected the same way, and found no flowers, but the *leaves* just as I have described these. I shall label mine forma *autumnalis*, until I hear that it occurs in the spring blooming

Of course, I shall save plants from the same patch next spring.

J. M. BATES,
Callaway, Custer County, Neb.

A GERMINATING COCOANUT.

While cracking open a cocoanut one day last week, I was surprised to find in it a very peculiar growth. A beautiful white, spongy puff-ball rose from the inner side, being firmly attached to the eyes. It was about two inches in width. Every portion of the kernel was easily removed, leaving the growth standing intact in the shell. Strange to say, the nut was perfectly sweet. As I had used many nuts, and had never seen anything similar before, I sent it to the botanical garden, there to discover whether it was really an unusual occurrence. It was examined with interest. Dr. McDougal, in "The Nature and Work of Plants," speaks of the germination, as follows:

"The absorbing organ, the inner end of the embryo, which is made of the cotyledon, has developed a mass of tissue very much the shape of a puff-ball, which is at first the size of a marble, but which gradually enlarges until it fills the cavity of the nut. It uses the milk for food as it grows, and furthermore, it secretes digestive fluids (enzyms), which dissolve the starch and oil in the endosperm, about as it would be done in the human stomach. The fluid thus obtained is conveyed back into the young plant and serves as food. The endosperm may be seen to be thinner where the absorbing organ has touched it. The amount of food furnished by the endosperm is so great that the plantlet may be nourished many months from it alone, and generally it is entirely consumed, remaining sweet and sound as long as a trace is present."

NEW YORK CITY. PAULINE KAUFMAN.

A CURIOUS ROOT PARASITE.

Some months ago Mr. Gerrit S. Miller, of the U. S. National Museum, received from a correspondent in Mississippi a small box of specimens of *Apteria setacea* Nutt., the curious little Burmanniaceous parasite. Following is the account of the plant, as it occurs in nature:

The plant, as I stated before, grows in shady woods, on hillsides—principally southern slopes—preferring the damp, sandy soil bordering the little swampy bottoms that intersect the pine woods of this coast section. It also grows on the tiny hillocks in these bottoms formed by mold collecting on the roots of white bay (*Magnolia glauca*) and black gum (*Nyssu multiflora*), but never, apparently, on the positively wet ground between these hillocks. The species upon which I have observed it to be parasitic are seven: *Magnolia glauca, Nyssa multiflora, Quercus rubra, Oxydendrum arboreum, Azalea multiflora, Pinus taeda, Acer dasycarpum.* The first two and the last being very common trees in the bottoms or "bay galls," are perhaps the most typical hosts; but any tree within the limits prescribed by the necessary degree of moisture and shade seems to be subject to this mildest of parasites. It is impossible that the species has been introduced, I think. The season of flowering of this plant is very long, extending from about April to November; at present not so many flowers are to be seen as might have been found a month ago, but they are still common.

Thanking you for the trouble you have already taken, and in advance for your further examinations, I remain,

ANDREW ALLISON.

BAY ST. LOUIS, MISSISSIPPI,
October, 1901.

GENERAL ITEMS.

According to the *Queensland Agricultural Journal*, the water hyacinth (*Piaropus*) has been introduced into and is rapidly spreading in certain of the rivers of Australia.

The Department of Agriculture has just issued a pamphlet by the late Dr. Charles Mohr, under the caption of "Notes on the Red Cedar." It contains notes on the distribution of this valuable tree, its growth and development, enemies and its botanical description and morphology. It is intended to follow this preliminary report by a more detailed study of the tree in the field.

It is a rather common error among people not very familiar with plants that the trunks or stems of all plants elongate, and that the branches starting from the main stem of a tree, five feet from the ground, say, will a year or two later be six or seven above the ground. This is not so. The first year, while the main stem or axis is growing, a small young branch may be carried with the growth, but usually only in the shape of a bud, even then. After that, the position of the branch is fixed.—*Meehans' Monthly for January.*

Dr. Edward Palmer, the veteran botanical explorer of Mexico, left Washington, January 15th, for a collecting expedition in the province of Santiago, Cuba. He will obtain the usual number of sets, which will be offered for sale upon his return. Dr. Palmer will be accompanied by Mr. Charles Louis Pollard and Mr. William Palmer, both of the United States National Museum, who will collect plants, mammals, birds and reptiles for that institution. As the party will pay especial attention to the unexplored mountains in the southern portion of the province, it is expected that the scientific results will be considerable.

Prof. C. F. Wheeler has recently published [Michigan Ag. Sta. Bull. 186], a brief account of the occurrence of the dwarf mistletoe (*Arceutho-*

bium pusillum). This mistletoe was observed on black spruce in tamarack swamps a short distance from the Michigan station. It was noticed in a number of other places and seems to be widely distributed in the upper peninsula, having been observed in nearly every tamarack swamp to a distance of a hundred miles. In some of the swamps nearly every tree had been killed. The parasite stimulates the branches of the tree to extra growth, forming witches' brooms of considerable size, and when a number of branches are affected the tree dies as a result of the attack. A fungus (*Wallrothiella arceuthobii*) was found parasitic in the fruit of the mistletoe, and is thought that the fungus may to a considerable extent check the spread of the pest.

It has long been known that many seeds could be subjected to low temperature without seriously impairing their power of germination. Thus, in 1834, Edwards and Colin subjected seeds of wheat, barley, rye and broad bean to a temperature which froze mercury, after which their power of germination was unchanged. Wartman, in 1860, experimented with a great variety of seeds, subjecting one lot to a temperature of —57°C for thirty minutes, and another to —110°C for twenty minutes, after which germination was unimpaired. A. D. Selby has recently recorded [Bull. Torr. Bot. Club, 28 : 675–679] the results of some experiments on seeds of common cultivated plants after prolonged immersion in liquified air. The temperature of liquified air is stated at —190°C. The seeds were immersed for periods varying from 6 to 48 hours, with the result that of some, as sunflower, cucumber and rye, the germination was 100 per cent., of others less, but in no case were all destroyed. As the author well says : "The facts lend a new significance to the latent life of seeds."

The leaves of the tulip tree, as every one knows, are among the most striking of any of our native trees. They are large, glossy, green leaves, rather broadly ovate in general outline, but with the upper portion cut more or less squarely across, as though cut artificially. They stand on long petioles, at the base of which is a pair of usually large rounded stipules. The manner in which these stipules have originated was long ago suspected from a study of certain fossil forms of *Liriodendron*, but it has only recently been demonstrated by a study of the living species. Edward W. Berry [see Bull. Torr. Bot. Club, 28 : 493–498] has succeeded in bringing together a series of leaves which seem to prove beyond question that they originated as basal lobes of the blade, and have been gradually pushed down to their present position at the base of the petiole. At one stage, which is well represented by a fossil species, it was in the form of a broad margin or wing to the petiole.

After prolonged search, Berry has found all stages between a basal lobe and the normal form with the stipules separated from the blade by the whole length of the petiole.

A NURSERY SCHOOL OF BOTANY.—An innovation that is not only unique and quite original, but useful as well, has recently been made by Thomas Meehan & Sons, the nurserymen and landscape engineers, of Germantown, Philadelphia. This concern has established for its employes a school of botany with a systematic course of study, and it has already met with great encouragement.

This school is under the direct personal care of Mr. S. Mendelssohn Meehan, a member of the firm, and Mr. Ernest Hemming, a Kew graduate, who is a specialist in herbaceous plants and in charge of that department for the firm. The former teaches the advanced members of the class, and the latter instructs the younger element. Both express themselves as being well pleased with the progress of their pupils.

Every employe is eligible, from the veteran who has grown gray in the service to the apprentice who puts in time washing pots. It is surprising and encouraging to see what interest all the members of the class take and what progress they make.

Nothing could better show the advancement of the nursery business in this country; it is working ever upward. The value of the trained man is becoming every day more appreciated. This departure indicates a desire on the part of the employer to educate the employe; raising the man's standard and thus making him worth more in every way. Heretofore the training received in nursery work was mostly through individual effort, and not so much through the teachings of his superiors.

For the nursery worker the benefits to be gained by studying botany can be readily seen. The advantage such a class has to make the most of its studies on a large and complete nursery may be well appreciated.

The meetings are held in the evenings, and the course has been so arranged to make it interesting and to eliminate as far as possible the natural dryness of the study.

EDITORIAL.

WITH THE present number THE PLANT WORLD enters upon its fifth volume and the sixth year of its existence, which may be taken as a demonstration of the fact that it fills a distinct need and has come to stay. We have been especially gratified by the many cordial words we have received from our friends and patrons. Our subscription list has increased gratifyingly, and only eleven subscribers have discontinued their subscriptions during the year. It is not meant to imply by this that our subscription list has reached the point we would wish, for an increased support will find expression in an increased size of the journal. We already contemplate the addition of four pages at an early day, and can promise that further increases in size will follow the moment circumstances warrant.

Volume five will be in every way superior to the earlier volumes. Among the good things will be a series of papers on American Botanical Gardens, the first of which appears in the present number, occasional articles on the origin of cultivated plants, accounts of some of the earlier botanists, and the usual number of original articles on a great variety of topics.

It is also the intention to illustrate the present volume more fully, and to this end we have secured some of the finest photographs that have ever been taken, showing tropical vegetation, groups of native plants, etc. The chapters on the Families of Flowering Plants will be pushed to a conclusion, if possible, during the year. As before, they will be very fully illustrated, and when complete will form a concise description of all the families of this great group.

We regret exceedingly the delay in issuing the present number. It is occasioned by changing printers, and we trust will not occur again.

The table of contents and index for Vol. IV will be sent out with the February number, as sending it with the present issue would have necessitated still further delay.

BOOK REVIEWS.

FOREST TREES AND FOREST SCENERY. By G. Frederick Schwarz. New York: The Grafton Press. 1901.

A few years ago there was a great awakening of interest in the study of our birds, which led to the publication of a considerable number of popular works dealing with the subject. In like manner there has recently begun a new interest in forests and forest management, which has already begun to bear fruit in the shape of popular treatises, the charming little volume before us being an example in point. It has been prepared, the author says, for the purpose of making some simple inquiries into the sources of beauty and attractiveness in American forest trees and sylvan scenery. He first takes up the more important of our forest trees, both broad-leaved and coniferous, giving the characteristic growth and appearance of each, and shows how all blended together make the harmonious whole that is so attractive in forest scenery. There are also chapters on forest adornment, the distribution of our American forests and a final chapter describing briefly the artificial forests of Europe.

The book is copiously and beautifully illustrated, and the typography is unexceptional. Altogether it is a book that should stimulate and encourage a wider knowledge of our trees. F. H. K.

AGRICULTURAL BACTERIOLOGY. A Study of the Relation of Bacteria to Agriculture. By H. W. Conn, Ph. D., Professor of Biology, Wesleyan University. 8vo. Cloth. Price, $2.50. P. Blakiston's Son & Co., Philadelphia. 1901.

We have here a work of great practical economic importance. Bacteria, though exceedingly small and unobtrusive as individuals, have the faculty in mass of making themselves very conspicuously felt. Their importance for weal or woe in connection with the various agricultural processes has not been appreciated until very recently, and this is the first attempt, so far as we know, to bring the results of the latest investigations together in such a manner as to make them accessible and comprehensible to the progressive American farmer and student of agriculture.

The subject is treated in five parts, as follows: I. General Nature of Bacteria and Fermentations. II. Bacteria in Soil and Water. III. Bacteria in Dairy Products. IV. The Relation of Bacteria to Miscellaneous Farm Products. V. Parasitic Bacteria.

In the first chapter the author has given a brief sketch of the developmnet of bacteriology. This is very interesting and instructive.

But little more than 50 years ago, these organisms were objects of interest to a few microscopists only, their vast economic importance being scarcely dreamed of. The person who would have ventured to justify their study on the score of their possible economic importance in agriculture would no doubt have been the laughing stock of all practiacl men. This is but one from the many illustrations which might be given of the great practical and economic importance and bearing which subjects, apparently the most obstruce, suddenly assume when they have been sufficiently investigated to show their connection with the processes of human activity.

The different phases of the subject treated in the various chapters are discussed in a clear and untechnical manner. The book should be read by every progressive farmer and every agricultural student.

C. L. S.

LEAVITT'S OUTLINES OF BOTANY. For the High School Laboratory and Classroom. Prepared at the request of the Botanical Department of Harvard University, by Robert Greenleaf Leavitt, A. M., of the Ames Botanical Laboratory. Cloth, 8vo., 272 pages. Price, $1.00. Same. With Gray's Field, Forest and Garden Flora. Cloth, 8vo., 591 pages. Price, $1.80. American Book Company, New York, Cincinnati and Chicago.

This book has been prepared to meet a specific demand, and combines, with great simplicity and definiteness in presentation, a careful selection and a judicious arrangement of matter. It offers—1. A series of laboratory exercises in the morphology and physiology of phanerogams. 2. Directions for a practical study of typical cryptogams, representing the chief groups from the lowest to the highest. 3. A substantial body of information regarding the forms, activities and relationships of plants, and supplementing the laboratory studies.

The laboratory work is so chosen that it is adapted both to schools possessing extensive equipments and to those with only limited apparatus. The order of arrangement follows in the main that of Gray, and while morphology and physiology are fully treated, special attention is paid to ecology or the relations of the plant with its environment. There are nearly four hundred carefully drawn illustrations in the book. The appendix contains full descriptions of the necessary laboratory materials, with directions for their use, as well as suggestions for helpful exercises, addressed primarily to the teacher, and indicating the most effective pedagogical methods. On the whole, the work is a noteworthy addition to botanical text-books, as it presents the latest advances in the science in a form not too difficult or extended for practical use in an elementary course.

THE PLANT WORLD

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A BOTANICAL ASCENT OF MOUNT KTAADN, ME.

JOHN W. HARSHBERGER.

MOUNT KTAADN is situated in the eastern portion of Piscataquis county, Maine, in the midst of a wilderness of forest, streams and lakes. It is inaccessible to the ordinary tourist, because situated in a region without wagon roads, railroads and streams navigable to steamboats. The mountain looms up grandly from all points and dominates the country for miles around its base. The obstacles to travel mentioned above are, however, a recommendation to some who desire to get away from the artificialities of civilization, and who are anxious to come into close touch with nature. The Maine wilderness, with all its ruggedness and inaccessibility, exerts upon such lovers of out-door life a powerful attraction. The writer, who for a long time, was desirous of visiting the Maine wilderness, took a botanical trip to the summit of Mount Ktaadn, in July and August, 1900.

ITINERARY.

While stopping over Sunday at Bangor, the Stacyville route (the one ascertained later to have been taken by five members of the New England Botanical Club* three weeks before) was mentioned as the one most feasible. On a Bangor and Aroostook express train, leaving Bangor on Monday morning, July 30, 1900, it was the writer's good fortune to meet His Excellency, Hon. Llewellyn Powers, Governor of Maine, who kindly interested himself in the project to visit Mount Ktaadn. Governor Powers ascertained from a fellow-passenger, a lumberman of many years' experience, that the route to the mountain up the West Branch of the Penobscot River in the summer time was the most direct and pleasant. Accordingly, upon the suggestion of his Honor, the Governor, the writer alighted at Norcross, at the foot of North Twin Lake. Here, he found a small steamer, the Gypsy, that made regular trips at intervals of two or three days through North Twin Lake, Lake Pemadumcook, to the head of steamboat navigation in Ambajejus Lake. The steamer was about to leave when the train arrived, and the writer at once engaged a passage. From Norcross to the upper end of Ambajejus Lake is a distance of twelve miles. The steamer lands its passengers at the camp of Selden J. McPheeter, where provisions, canoes and guides may be procured for hunting, botanical, or fishing trips to the surrounding country.

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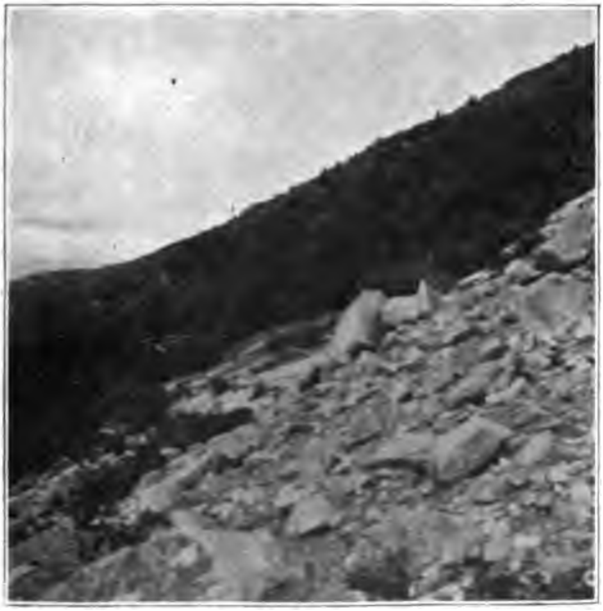
*RHODORA, Vol. 3, June 1901, p. 147.

Securing a guide in the person of Joe Cripps, and a canvas canoe, a start was immediately made after a substantial backwoods dinner. The first carry, or portage, was made about Ambajejus Falls, and the canoe was launched into Passamagammet Dead Water. At the second carry above the lake around Passamagammet Rapids, the guide secured from his cabin a rubber blanket, a woolen blanket, a teapot, a kettle, two tincups, three plates, two knives and two forks, which with an ax, several pounds of bread, a piece of ham, sweet cake, butter, salt, pepper, lard and tea completed our simple outfit, packed securely in a carrying basket and weighing in all about fifty pounds. Joe, the guide, carried the ax and canoe over the portage on his shoulders, while the writer "toted" the rest of the luggage in the Indian carrying basket. Passing the rapids at Joe Cripp's log house, the canoe was paddled over the smooth and placid surface of Debsconeague Dead Water, stopping to rest and pay our respects to Joe Francis, chief of the now civilized Penobscot Indians. Joe Francis's camp is beautifully situated on the broad waters of the West Branch of the Penobscot, in sight of Mount Ktaadn, many miles back in the wilderness. The next portage was made around Debsconeague Falls, and the canoe was again shoved into the smooth water of the river above, known as Pockwockamus Dead Water. Just as darkness was coming apace, a landing was made at the camp of Benny Harris, at a place called Ktaadn View, where we spent the night in a comfortable and well appointed log cabin of three rooms. In the middle room, which served as dining-room and sitting-room, we dried our wet clothing (having been caught in a thunder shower) before the large open fire-place. Mr. Harris, the owner of the place, and his wife spend the summer in camp, the winter in the settlements. The presence of a woman, consequently, added considerably to keep up the appearances of civilization. Mosquito screens in the doors and windows, a well appointed kitchen, partitions covered with large strips of birch bark in lieu of wall paper, books and novels in a book-case—all contributed to make the cabin home-like and attractive. An Indian, off on a hunt-



(1) Mt. Ktaadn, Maine, from Pockwockamus Falls.
(2) S. W. Slide and Pucker-bush, South Slope of Mt. Ktaadn.

ing trip, dropped in just before the family retired and entertained those assembled with a description and illustration of the best methods of tying snow-shoes upon the feet. An early start was made the next morning. Before starting, however, the writer was compelled to admire the view of river and forest with the massive bulk of Ktaadn in the background.

From Harris's Camp to the 4th Carry, made around Pockwockamus Falls, is a distance of about two miles. Abol Dead Water, after Pockwockamus Carry is passed, presents navigable water to Abol Falls, which are surmounted by a fifth portage. Just above Abol Falls, Abol Stream is passed and our destination by canoe reached, viz., Ktaadn Brook. Here the trail for the southwest slide leaves the river, and we accordingly turned the canoe upside down, distributed our provisions and outfit as judiciously as possible, and started for the mountain.

The trail is easily followed to an abandoned lumber camp (Foster's Camp), but, nevertheless, trees have been blazed to locate it. A stop was made at Foster's Camp for luncheon, which consisted of fresh brook trout, fried in lard, with bread, butter and biscuit, washed down with sparkling mountain water. The route from the river to Foster's abandoned camp lay along the valley of Ktaadn Brook, then up over a ridge through the open forest to another valley filled with huge moss-covered boulders over which we scrambled. The ascent began after we had reached a flat rocky outcrop several miles back in the forest from the old clearing at which we had dined. Soon after leaving the table rock, we came to the foot of the Southwest Slide, where massive boulders and loose sand had accumulated, over which our trail led. Just about sunset, we reached the bark lean-to, high up on the mountain, where we were to spend the night. The bark shack was easily located by a green island of verdure about half way up the Slide, in the midst of the tumbled and confused mass of boulders, soil and stones nearly destitute of vegetation. The lean-to shelter, built against the mountain side near a small stream, was constructed of large slabs of birch bark overlapping like shingles. A large fire was built in front of our abode for the night, and our bedding consisted of the imbricately arranged boughs of the fragrant balsam.

The next morning, August 1, 1900, we made an early start for the summit of the mountain. Leaving the camp at 5 o'clock, the summit was reached at 9 o'clock, after the roughest kind of climbing up the Slide and across immense rocks piled high along the southern rim of the table-land, just above the "pucker bush," consisting of dwarfed and stunted trees. Crossing the table-land, out of which several springs of cold, limpid water flow, and climbing over the flat slabs of red Ktaadn granite, the summit of the West Peak was reached at an elevation of

5215 feet. Here a cairn, constructed of loose stones, marks the highest point. The fog, which promised to lift when we reached the table-land, still hung about the top of the mountain. The great South Basin was completely hidden from sight and yawned at our feet, more awful, because veiled in mist. Thoreau* admirably describes just such a fog as the writer and Joe Cripps were in on the summit of Mt. Ktaadn, on August 1, 1900, in the following quotation from his book, "The Maine Woods:" "At length I entered within the skirts of the cloud which seemed forever drifting over the summit, and yet would forever be gone, but was generated out of that pure air as fast as it flowed away. Now the wind would blow me out a yard of clear sunlight, wherein I stood; then a gray, dawning light was all it could accomplish, the cloud-line ever rising and falling with the wind's intensity. Sometimes it seemed as if the summit would be cleared in a few moments, and smile in sunshine; but what was gained on one side was lost in another. It was like sitting in a chimney and waiting for the smoke to blow away. It was, in fact, a cloud factory—these were the cloud-works, and the wind turned them off done from the cool, bare rocks. Occasionally, when the windy columns broke in to me, I caught sight of a dark, damp crag to the right or the left; the mist driving ceaselessly between it and me. It reminded me of the creations of the old epic and dramatic poets, of Atlas, Vulcan, the Cyclops, and Prometheus. Such was Caucasus and the rock where Prometheus was bound. It was vast, Titanic, and such as man never inhabits."

The fog threatening to remain all day, the guide and the writer retraced their steps down the mountain, but not without a feeling of regret at having missed the magnificent view that unfolds itself when the clouds lift. A considerable number of alpine plants were gathered under such unpropitious conditions. These were carried back to the bark camp, where we had left our outfit in essaying the mountain top, and together with the plants collected on the slopes and ridges below form the basis of the botanical description of the trip. Leaving camp after a hurried lunch, the river was reached after an exhausting tramp of twelve miles through the wilderness. Night was spent opposite Abol Brook in a deserted log cabin, fitted up with two bunks and a large cook stove. In the morning of August the second, 1901, Benny Harris's Camp was passed and McPheeter's settlement was reached in the afternoon of the same day, after three days' absence, to the astonishment of everyone. Fortunately, the steamer was delayed by about an hour in the loading of timber, so that hurriedly packing the plants collected in an empty starch box, the writer was in time to reach the railroad and

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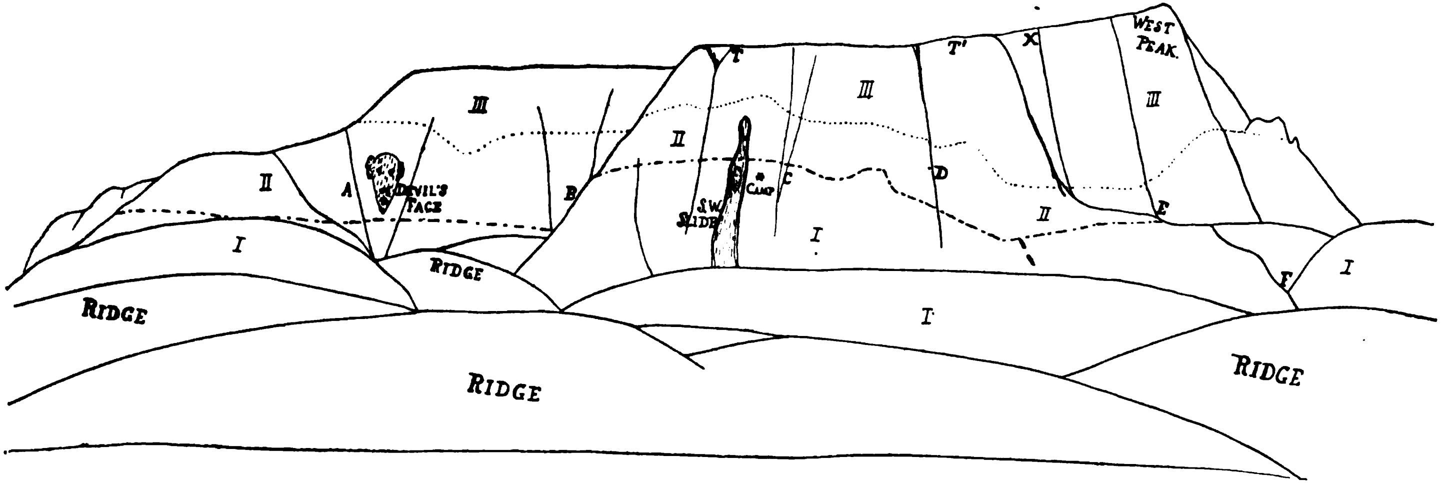
*THORRAU, *Maine Woods*, p. 84.



LEGEND.

Profile of Mt. Ktaadn, Maine, as seen from West Branch Penobscot River.

……… Upper limit of Pucker-bush.
- - - - - Upper limit of Normal Trees.
I, II, III, Belts of Vegetation, Mt. Ktaadn.
T, T′ Limits of Alpine Table-land.

take the evening express train for Houlton on his way north to the Canadian frontier. The entire trip from the station at Norcross to the summit of Ktaadn and return to the railroad was accomplished between Monday morning and Thursday evening. The whole distance traveled by steamer, canoe and on foot was about eighty miles through a wild and rugged wildnerness.

TOPOGRAPHY.

Mount Ktaadn, as seen from Pockwockamus Dead Water, is a long elevated ridge several miles in length sloping gradually from the west and culminating at the eastern end in the West Peak, 5215 feet high. The mountain rises far above the elevation of any surrounding land, reaching well above timber line. From the south side, the mountain rises precipitously, as a great ridge, from the lowlands of the West Branch of the Penobscot, the grandest mountain in New England. To reach the Southwest Slide, which is clearly seen from the river, it is necessary to cross some ridges and low spurs of the main orographic mass before reaching the foot of the mountain proper. The accompanying sketch made from Ktaadn View (Pockwockamus Dead Water) represents the south side of the Ktaadn range. Another large slide is seen to the west of the one mentioned above, called locally the Devil's Face, because of the shape and the patches of vegetation which represent the ears, eyes, nose and mouth. The letters a, b, c, d, designate gullies down which streams run to swell the volume of the mountain torrents that empty into the Penobscot. The top of the mountain between the points t and t′ represents the location of the alpine garden on the flat table-land. The slide up which a Ktaadn climber scrambles is composed of loose earth, boulders and smaller rocks entirely destitute of vegetation, except where islands of plants are encountered growing in soil held in place by larger boulders than common. The earth of the Slide, especially of the upper portions, is being constantly washed down to the flat country immediately below, and occasionally, when a land-slip occurs, huge boulders dash down the mountain side. Just before reaching the table-land from the Slide, huge blocks of granite piled up in every conceivable manner must be climbed across. This part of the ascent is by far the most difficult and trying. The descent here is equally difficult. The table-land is in most parts stony and rough, with a scanty growth of vegetation. It, however, supports many alpine plants, and may, therefore, be called an alpine garden. In one of the occasional tracts of bog, there is a spring of good drinking water. Between the table-land and the West Peak is an area (X in the fig.) piled up with loose flat boulders of red granite. In the crevices of one of the boulders at about 4900 feet, a single stunted wind-swept specimen of *Picea nigra* was found, a unique discovery, as the tree limit had been left far below on the mountain side at about 3500 feet (Williams in Rhodora, III., p. 161, says 2200 feet). The majority of the plants collected on the mountain summit by the writer, and marked summit plants in the list, were collected on the table-land, 4500–4900 feet, along its southern edge and among the loose boulders of granite already mentioned. The plants growing on the Slide were gathered near the bark shack (near camp in the fig.), or between this point and the table-rock mentioned above.

ECOLOGY OF THE REGION.

The region about Mount Ktaadn is a favorable one for ecological study. It presents a diversified character of topography sufficient to influence the character of the vegetation. We have here rivers, lakes, marshes, forests, upland mountain slopes destitute of timber, alpine bogs, table lands, and wind-swept mountain summits. Accordingly, in the marshes of the river and lake systems, we have a characteristic hydrophytic flora consisting of *Nymphaea odorata* Ait., *Nuphar advena* Ait. f., *Potamogeton natans* L., *Acorus Calamus* L., and *Iris versicolor* L. The river marshes, where the spatterdock and water lilies are associated with the rushes and sedges, are frequented by the moose, caribou and deer. On any morning during the summer, deer and moose may be seen at the water's edge feeding on the lily pads and lush aquatic plants.

The mesophytic forest, consisting of birches, maples, spruces and balsams, with occasional groups of white pine, mountain ash and larch, supports beneath the shade of the dominant trees an abundant herbaceous and fungal element. The fungi noted on the tramp through the woods were *Amanita muscaria* L., *Amanita phalloides* Fr., *Hydnum septentrionale* Fr., *Polystictus cinnabarinus* and several species of *Clavaria*. Associated with these in the gloomy recesses of the forest was *Monotropa uniflora* L., the corpse plant, a true saprophyte. Along the streams grow *Alnus viridis*, *Hamamelis Virginica* L., *Corylus rostrata* Ait., and a number of willows, *Salix*. The forest floor supports *Cornus Canadensis* L., *Coptis trifolia* Salisb., *Chiogenes serpyllifolia* Salisb., *Habenaria fimbriata* R. Br., *Trientalis Americana* Pursh., *Oxalis acetosella* L., *Dalibarda repens* L., *Pyrola rotundifolia* L., var. *uliginosa* Gray. The drier, better drained soil of the more open forest is characterized by the presence of slightly xerophytic herbs, such as *Epigaea repens* L., *Anaphalis margaritacea* Benth. & Hook., *Campanula aparinoides* Pursh., *Pyrola secunda* L., and several species of the genus *Vaccinium*. The marshy places in the woods, where the leaf detritus collects, forming mucky stretches, sustain *Veratrum viride* Ait., *Drosera rotundifolia* L., *Osmunda regalis* L., etc. The moss-grown boulders under the trees are on their exposed upper faces covered with a lichen, *Umbilicaria* sp., while patches of hair moss, *Polytrichum commune*, are found here and there throughout the woods.

Several well marked belts of vegetation can be delimited on the mountain side: (1.) the belt of lowland timber extending, as shown in the figure 1, half way up the southern slopes of Mount Ktaadn. These trees approach, more and more, a xerophytic condition, as the elevation increases, until approximately an elevation of 3,000 feet is reached, when the belt of normal sized trees gives way to the pucker-bush. This forest consists of five or six dominant trees, *Picea nigra* Link, *Betula papyrifera* Marshall, *Betula lutea* Michx. f., *Pyrus Americana* D. C., *Abies balsamea* Mill., *Acer rubrum* L., and *Acer spicatum* Lam., with thickets of *Alnus viridis* D. C., growing on the Slide. (2.) The belt of stunted trees, the pucker-bush (II.) extends to an elevation of about 3,700 feet. It consists largely of ancient black spruce trees (*Picea nigra*), that have battled with the elements for years, assuming, therefore, a striking xerophytic habit. Thoreau, in his "Maine Woods," p. 81, describes his impression of this region of the mountain side in the following fine description: "At first scrambling on all fours over the tops of ancient black spruce trees, old as the flood, from two to ten or twelve feet in height, their tops flat and spreading and their foliage blue and nipped with cold, as if for centuries they had ceased growing upward against the bleak sky, the solid cold, I walked some good rods erect upon the tops of these trees, which were overgrown with moss and mountain cranberries. It seemed that in the course of time they had filled up the intervals between the huge rocks, and the cold wind had uniformly leveled all over. Here the principle of vegetation was hard put to it. There was apparently a belt of this kind running quite around the mountain, though, perhaps, nowhere so remarkable as here. Once slumping through, I looked down ten feet, into a dark cavernous region, and saw the stem of a spruce, on whose top I stood, as on a mass of coarse basket work, fully nine inches in diameter at the ground." Mountain ashes and alders also grew in association with the black spruces of the pucker-bush. Sparingly on the Slide in this belt were found *Cornus Canadensis* L., *Potentilla tridentata* Ait., *Spiraea salicifolia* L., *Empetrum nigrum* L., and *Ledum latifolium* Ait. (3.) The belt above timber line (III.), extending across the confused mass of granitic boulders up to the rim of the table-land and mountain summit, is crossed next with but few plants to reward the botanist. (4.) The upper stretches of the mountain, including the alpine garden on the table-land and the immediate summit of the mountain, forms the alpine belt of Mt. Ktaadn. To it are restricted the true alpine plants found by the writer in making the ascent from the south and precipitous side. Among the rocks of the table-land and summits are found the cespitose clumps of *Diapensia lapponica* L., *Arenaria Groenlandica* Spreng, *Vaccinium vitis-idaea* L., while patches of less dense character consist of the alpine willow, *Salix uva-ursi* Pursh., *Potentilla tridentata* Ait., *Solidago virgaurea* L., var. *alpina* Bigel., *Ledum latifolium* Ait., *Empetrum nigrum* L., *Lycopodium lucidulum* Michx., *Rhododendron lapponicum* Wahl, and the single specimen of *Picea nigra*, Link. Growing as individuals in the alpine garden were found *Prenanthes Bootii* A. Gray, *Cornus Canadensis* and *Potentilla tridentata* Ait. Upon the rocks of the highest summit were gathered *Cladonia rangiferina*, *Cladonia coccinea*, *Umbilicaria* sp., *Buellia* sp., a yellowish green lichen appressed to the surface of the granite rocks.

It should be noted before closing this account that species, such as *Corans Canadensis* L., that were in fruit on the lower slopes of the mountain were in full bloom on the summit. This is a fact of general import where one is dealing with the altudinal distribution of plants. Plants also, like *Arenaria Groenlandica* Spreng., and *Cornus Canadensis* L., became dwarfed in habit as the higher elevations of the mountain are reached, until they may be only an inch or two high, with more highly colored flowers than the corresponding plants of the lowlands below.

UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.

ANOTHER TRIP TO GLEN BURNIE, MARYLAND.

BY C. E. WATERS.

MR. PLITT'S article in the November number of the PLANT WORLD was read with much interest, for the pond and the surrounding woods form one of my happy hunting grounds. I am not the "Mr. W.," with whom he went, although we have been tramping together. This is written, not to show how much he overlooked, but to indicate that two persons may go over the same ground and see quite different things. I have never seen the *Habenaria tridentata*, or *H. ciliaris*, the *Clitoria*, or *Sabbatia*, the *Eryngium* or the *Discopleura*.

Perhaps, it is not quite fair to call this "another trip," for I am going back over a series of trips, and shall pick out here and there things of interest.

Near that old furnace is a tiny stream so filled with *Marchantia* that the thalli stood on edge usually. There we found *Pellaea atropurpurea* in abundance in the crevices of the furnace and on an old wall nearby; a strange phenomenon, for the nearest plants growing on rocks are miles away. This furnace is on the sandy Coastal Plain, within a few feet of tide-water. Going back to the pond we cross woods, where we find *Tephrosia Virginiana, Pogonia verticillata,* and once two plants of *Viola pedata,* with white flowers. *Iris verna, Kalmia latifolia* and *K. angustifolia* are abundant. We have found in the sandy road numbers of ant-lions, those curious creatures that lie concealed at the bottom of conical pits, waiting for unwary ants to tumble into their jaws. Tube-spiders also find no difficulty in excavating their homes in the loose soil. These woods are periodically burned over to "drive away the snakes." My informant was a colored man, who told me it was sure death to let a tree frog get on you, so his statement may not be worth much.

The *Marsilea* at the pond was planted by me about five years ago. It disappeared for a year, but is now very abundant. This pond is a treasure house. In it, or on its shores, we have found *Brasenia,* two or three species of *Potamogeton, Drosera rotundifolia* and *D. intermedia Americana; Sphagnum* has been found in fruit, and *Utricularia vulgaris* has been seen. The sphagnum bog, at the head of the pond, is of especial interest, for there we get pitcher plants and small water lilies growing in water a few inches deep. *Lycopodium adpressum* Chapm., formerly distributed as *L. inundatum Bigelovii,* is abundant. Its spores ripen early in October. This is truly a "quaking" bog that seems no wetter after a heavy rain than after a drought. We have found, by sinking in nearly to the knees, that it is underlaid by a hard bed, probably of gravel. Near the furnace, just at the head of tide-water, the mud is very much deeper and softer. Once we managed to walk across it by stepping on the large tufts of *Orontium aquaticum* that were there in abundance.

Going back still further from the pond we come to the woods where several interesting ferns are to be found. The most abundant, next to the brake fern, is the cinnamon fern, and a variety of it which we found first in July. It differs from the type in being more or less densely covered with glandular pubescence, and it has therefore been called var. *glandulosa.* With these we find *Woodwardia Virginica* and *W. angustifolia.* The first of these closely resembles the cinnamon fern, but may be distinguished readily by the practiced eye. The latter is very much like the sensitive fern at first sight. Just as the variety *obtusilobata* of the sensitive fern represents a form intermediate between the sterile and fertile fronds, so we find similar fronds in the case of the *Woodwardia.* The pinnae are broader and less fertile, or the lower pinnae may be sterile. We have seen cases in which one side of the pinnae is contracted and fertile, the other expanded and sterile. The fertile fronds grow erect with the pinnae curiously curved, and the tip has a decided "quirk" in it. We have noticed much the same thing in *Nephrodium cristatum,* which also grows in these woods, and it seems probable that it is a peculiarity of all fronds that grow erect. It gives the upper pinnae, which cannot twist into a horizontal position, a chance to get as much light from above as possible. A form of *Nephr. spinulosum* and one little clump of *N. Boottii* grow here. Strange to say, the sweet fern, *Dicksonia*, seems to be at home in these low, damp woods, although it is usually seen with us on dry hillsides in rather poor soil.

The marsh shield-fern, *N. Thelypteris*, is found in the woods, but on account of the shade is sterile. Near the pond it gets more light and fruits heavily. With it grows in large patches its near relative, *N. simulatum*, a fern so nearly intermediate between it and the New York shield-fern that we could not decide on a name when it was first seen in 1894. What a surprise it was, mingled with some regret, when Mr. Davenport published it as a new species two months later.

In the stream which flows swiftly over a gravel bed we see innumerable caddis-worms in their cases, made of bits of sticks and tiny stones. Here and there are plants of wild-celery (*Vallisneria*) much smaller than those growing in the vast reaches of shallow, brackish water along the bay, where they form the chief food of the canvas-back duck.

If we visit these woods in May, or early in June, we will not fail to gather a bunch of fragrant swamp magnolias, *M. glauca*, to take home with us.

BOTANIZING IN WINTER.

By C. F. Saunders.

When the cold weather sets in late in the autumn and Jack Frost has put his seal upon the landscape, too many plant lovers hang up their vasculums and fall to sitting by the fire until the hepaticas come again in March or April. We should add to our knowledge if we stirred about the fields and woodlands in winter time more than we do, for at this season plant life is really not so much dead as sleeping, and life, under however discouraging an environment, always is worthy of attention.

There are, first of all, the evergreen plants, many of whose characters may be studied as effectively in winter as in summer, while the deciduous shrubs and trees offer an unfailing source of entertainment in their buds, which are generally set on in the autumn and develop gradually as the days lengthen after the turn of the year. One whose attention is for the first time directed to the winter buds of our ordinary forest trees cannot fail to be struck with the great variety and delicate beauty that mark them, and if he is situated so as to be able to watch a particular group of them for a succession of weeks, he may become nearly as much interested in their progress as in that of his neighbor's baby.

Fruits and seed-pods present another subject of pleasurable investigation during winter outings. Many berries persist on the bush nearly or quite until spring, as of various species of hollyworts and smilax and the sugarberry, while of dry seed-vessels, as every one knows, the number is very great. To one who loves plants few exercises are more fascinating than the taste of solving the riddle of some leafless stalk by means of a resistent seed-vessel, and study of this kind has a special merit in that it frequently fixes attention on characteristics that otherwise would perhaps have been overlooked. Of course, with such meagerness of material as is provided by a withered pod—and that, perhaps, seedless—these detective studies in botany are full of baffling difficulties. That, however, serves all the more to stimulate one's ingenuity, and to make one alive to such helping clues as may be afforded by some late clinging leaf or some feature present in the bark or in the plant's tissue. Thus more than one novice who was puzzled over the identity of the black fist of fruit which the skunk cabbage casts upon the winter earth, has first learned what it was by getting a whiff of the assafœtida-like odor that is released on cracking out the seeds. Indeed a man must be very learned or very unobservant, if a winter afternoon in the fields and by the fencerows does not make him richer by at least one fact or suggestion or fruitful fancy added to his mental store. These bits of knowledge apprehended directly from nature's lips are rarely ever forgotten, and the intellectual palate finds in them the same indefinable sprightliness of flavor that delights the physical taste in the meat of a nut picked from the ground or of a berry gathered from the bush.

Then, too, winter's bareness of leaf sometimes reveals the hiding places of rare plants whose existence in a given locality had not been suspected. On the outskirts of the city of Camden, New Jerssy, is a bit of a swampy woodland which I included in a ramble one cold afternoon. As I stepped from hummock to hummock under the alders and red maples, my attention was attracted by patches of long purplish spatulate leaves arranged in clusters flat on the frozen earth. The more I looked at them the surer I became that I had never seen that plant in my excursions near home, and the more curious I grew to know it by name, but in the absence of flowers or fruit, the problem seemed hopeless of immediate solution. Suddenly memory waked up and it flashed into my mind that these were the radical leaves of the very local *Helonias bullata*—a rarity which at that time I had met with but once and for which I knew of no locality except in the pine barrens many miles away. So, too, the rare climbing fern (*Lygodium palmatum*) may be readily discovered in perfection of frond in winter thickets, where a leaf tangle screened it from view at other seasons. Two rare smilaxes of southern New Jersey, which may be sought in vain in summer, are sometimes disclosed to the view of ramblers in the snow. These are *Smilax Walkeri* and *Smilax laurifolia*, the former made conspicuous by its strings of bright red berries, and the latter by its rich green foliage overspreading thickets stripped of deciduous leafage by the cold.

A PRIMROSE AT HOME.

By F. H. Knowlton.

TO my mind the genus *Primula* affords some of the most beautiful and attractive plants that are to be found in the whole range of the vegetable kingdom. Attractive in foliage, bright and dainty in coloring of flowers and delicate in fragrance, they are always objects of interest. Since the cultivation of the more showy exotic species has become so general, primulas have come to be ranked among the choicest of flowering plants, but quite as beautiful are certain of our native species when seen in the full setting of nature.

The genus *Primula* is large and widely distributed, occurring mainly in the northern hemisphere, with a few extending to Java and the Straits of Magellan. The number of species is placed by Pax, the latest monographer of the genus, at 145, but even these figures probably fall short of the actual truth. Of this number North America possesses about 15 species, three of which are found in the northeastern portion of the continent and the remainder in the high mountains of the west and northwest.

Of all the species found in North America, perhaps none is more attractive than *Primula Parryi*, the subject of our plate. This species, as its name implies, was discovered by Dr. C. C. Parry, in the Rocky Mountains of Colorado in 1862.

It is a very abundant species, in suitable situations, along alpine brooks, from Colorado to Arizona and Nevada. It is a large species, with rather succulent, spatulate-oblong or oblanceolate leaves, and a scape 6 to 12 inches high, bearing a cluster of from 5 to 12 large crimson-purple flowers, each with a yellow eye.

I well recall my first introduction to *Primula Parryi*. We had been encamped for some days at Little Spring, near the base of San Francisco Mountains, Arizona, waiting for a favorable opportunity to make the ascent of San Francisco peak. This mountain, a huge pile of volcanic rocks, rises to a height of 12,147 feet, and from our camp we

Parry's Primrose (*Primula Parryi*).

noticed a number of bright green patches of vegetation that stood out in strong contrast to the brown volcanic rocks a thousand or more feet below the summit. After a somewhat laborious climb we gained the line of one of these patches of green and found it to be composed almost entirely of the foliage of this primrose. It was almost past flowering, but in sheltered nooks we found a number of blooming scapes still in their prime. It must have been a most gorgeous sight when in its perfection, and was worth going miles to see.

The plate of *Primula Parryi*, which we are able to present, is from a photograph made by Mr. Whitman Cross, of the U. S. Geological Survey, in the mountains of southwestern Colorado.

BRIEFER ARTICLES.

A FOSSIL NUT PINE.

Fossil remains that can with reasonable certainty be referred to the genus *Pinus* are of quite common and wide distribution in this country. These species have been variously based on wood, leaves, cones and seeds, many of them being clearly of the type of the white pine (*Pinus Strobus*). It was with a good deal of pleasure that I received some months ago, from Mr. Waldemar Lindgren, of the U. S. Geological Survey, a finely preserved cone that obviously belonged to the group of nut or piñon pines. It was obtained by one of his associates in the Snake River Valley, near Bunard's Ferry, Idaho. Unfortunately it was not found in its natural position, having been picked up by a local ranch owner, but with little doubt it is from the Pliocene lake beds that are so abundantly exposed in that vicinity. This cone, to which I have given the name of *Pinus Lindgrenii* [See *Torreya*, Vol. I., Oct., 1901], is, as may be seen from the figures, [fig. 1] ovoid or nearly globular in shape. The lower or fertile scales are very thick, and the nut is relatively large. The cone is irregularly broken through the fertile portion, thus well exposing the large seed cavities at the base of the scales. [See fig. 2.] In several of the seed cavities fragments of the very thin and evidently brittle shell of the seed can still be observed, and in one cavity a brownish, carbonaceous mass appears to represent the seed itself.

So far as I am now aware, this is the first undoubted nut pine to be described in a fossil state from this country. In the compact, almost globular, shape of the cone, this pine seems most closely to resemble the piñon (*Pinus edulis*), but the size and shape of the scales, and the larger

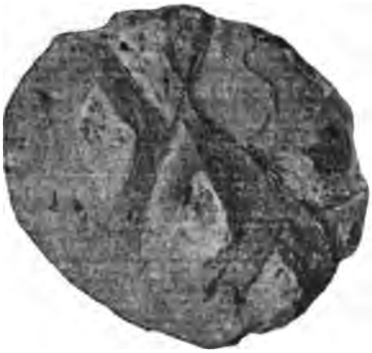


FIG. 1. SIDE VIEW OF CONE.

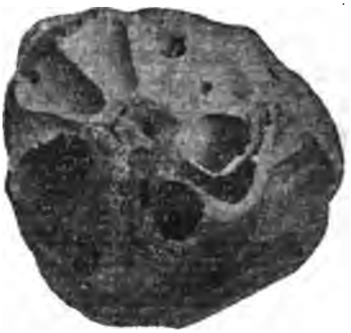


FIG. 2. BASAL VIEW.

seeds seem to bring it closer to the single leaf piñon (*P. monophylla*). Although having a cone that was apparently little, if any, larger than the ordinary cones of *P. edulis*, the seeds are noticeably larger than those of either this species or *P. monophylla*. The present range of the piñon pine covers the general locality where *P. Lindgrenii* was found, while the single leaf piñon occurs more to the southward, yet the conditions during Pliocene times may have been very different, and it is perhaps reasonable to conjecture that this fossil species was the ancestor of *P. monophylla*.

The figures illustrating this fossil species are reproduced from *Torreya* by the courtesy of the editor of that journal.

F. H. KNOWLTON.

VITALITY OF SEEDS.

The various experiments which have been lately conducted to ascertain the effect of low temperatures upon the vitality of seeds have led the author to investigate the effect of high temperatures upon the vitality of a large number of seeds. The author has found that by drying seeds in an oven at 65° to 75° C. for a day, and then at 90° C. for a day, a great many seeds will resist temperatures of 100° C. or even more. His experiments were made with oats, rye grass, lettuce, sunflower, musk flower, alfalfa, rape, California poppy, and poppy. Of these alfalfa proved the most resistant. After an exposure of one hour to 110° C. and then 1 hour to 121° C., 10 per cent of the seed germinated. Of other seeds investigated the maximum temperature was for poppies 100° C. and *Schizopetalon Walkeri* 105° C. The effect of exposure to the high temperature was noticeable in all cases by the marked retardation of germination and by the extremely slow growth afterwards. The young plants were weak and there seemed to be a loss of sensibility to geotropic stimulus. Whether the plants would become normal or not was impossible to say, as the conditions of the experiments were such that they could not be grown to maturity.

The author also reviews the experiments of Giglioli, in which the action of both liquid and gaseous poisons to seeds was shown. In these experiments prolonged action of oxygen, chlorin, nitric oxid, alcohol, and an alcoholic solution of corrosive sublimate on seeds did not entirely destroy the power of germination. The author repeated a number of these experiments. Alfalfa seed exposed from 10 to 30 days to the action of methyl alcohol, saturated solution of corrosive sublimate and picric acid, did not have the powers of germination noticeably affected. Seeds of different kinds of poppies resisted the action of alcohol, but were killed by corrosive sublimate solution. An experiment by the author seems to show that resistance to the poison is not due to a quiescent state of the protoplasm of the seed, but to the imperviousness of the seed coat. A large nnmber of seeds of alfalfa were selected, half of them punctured, all dried, and after drying immersed in the various solutions mentioned above. The uninjured seeds were not affected by the poisonous fluids, while the punctured ones had their vitality entirely destroyed—H. H. Dixon [Nature, Vol. 64, No. 1654], Abstract from Experiment Station Record.

GENERAL ITEMS.

THE Massachusetts Horticultural Society has just issued its schedule of prizes to be offered during 1902. This shows that the total sum of $8,075.00 has been set aside, distributed as follows: For flowers, $2,500.00; for plants, $2,000.00; for native plants, $175.00; for fruits, $1,700.00; for vegetables, $1,200.00; for gardens and greenhouses, $500.00.

WITH the January number *The Bryologist* becomes a bi-monthly. It continues under the editorial charge of A. J. Grout and Mrs. Annie Morrill Smith, and the January number contains illustrated articles on *Leneodon*, *Frullania*, *Funaria*, etc., as well as notes on new or little known mosses.

DR. HERBERT J. WEBBER, of the U. S. Department of Agriculture, has just published [Bulletin No. 2, Bureau of Plant Industry] a technical paper of the highest scientific interest on the sexual organs of *Zamia* or coontie of South Florida. Among the collateral results of this study Dr. Webber has demonstrated that there are at least two species of *Zamia* in Florida, when only one has heretofore been recognized as occurring, and also that the cones in various stages of development can be shipped by mail or express at least a three to five days' journey, and arrive in a perfectly satisfactory condition for microscopic study.

THE plants of Western Lake Erie, with notes on their distribution, is the subject of an interesting paper by Mr. A. J. Pieters [Bull. U. S. Fish Com. for 1901]. He divides all the plants into two groups: one including all submersed forms and those with floating leaves, and the other all remaining species with emersed leaves and growing with roots and parts of the stem in water. About 160 species are treated and full notes given as to their habits, internal structure, etc.

PROFESSOR AVEN NELSON recently began the publication of a series of descriptive papers on western plants under the title of Contributions from the Rocky Mountain Hebarium. The second number contains descriptions of new Colorado Species, Western Eupatoriae, and Studies in Arnicas.

F. JAENNICKE has recently published a valuable paper [Abhandl. K. Leopold, Carolin. Dent. Naturf., 77, No. 2,] on the genus *Platanus*. The author gives results of 5 years' study on this genus, and among his conclusions he states that there are 6 species and 11 varieties, as follows: *P. orientalis*, with 4 varieties; *P. occidentalis*, with six varieties; *P. acerifolia*, which he believes may prove to be either a variety of *occidentalis* or possibly a hybrid between *P. occidentalis* and *P. orientalis*; *P. racemosa*; *P. Mexicana*, with 1 variety, and *P. Wrightii*. The second and last three species are of American origin.

THE latest number of the contributions from the U. S. National Herbarium [Vol. VII., No. 3] by V. K. Chesnut, is devoted to the plants used by the Indians of Mendocino County, California. The author has spent portions of four or five seasons in making these inquiries into the native uses of plants, and he has brought together a large amount of very interesting and valuable information. The plants mentioned are arranged by families. After the Indian name follows the mode of preparation and uses to which the various species of plants are placed. The paper is quite fully illustrated, the figures showing certain of the more important species, as well as the finished products made from them by the natives.

WITH the beginning of the year *The Forester*, the organ of the American Forestry Association, was merged with *National Irrigation*, the organ of the National Irrigation Association, under the heading of *Forestry and Irrigation*. The January number contains articles covering both fields and is fully illustrated.

AMONG the forthcoming publications of the Clarendon Press, may be mentioned an authorized Translation of Schimper's Geography of Plants, by Percy Groom, M. A., and W. B. Fisher, B. A. We shall give an extended notice of this valuable work later.

THE Agricultural Department gives some interesting statistics showing the surprising growth of the cut-flower industry in recent years. The retail value of cut-flowers sold annually is now $12,500,000. Of this no less than $6,000,000 is paid for roses, $4,000,000 for violets and $500,000 for chrysanthemums.

THE recent researches of Overton on the red cell-sap of plants shows that its occurrence is conditioned upon the presence of sugar, and that the depth of the tints depends upon the concentration of sugar. Low night temperatures induce the development of such colors, which the author believes accounts for the reddish coloration of alpine species, and to the same cause are due the yellowish-red tints of evergreen leaves during the winter. If two plants of the ordinary bladder-wort (*Utricularia*) are grown in separate dishes of water containing different proportions of sugar, the relation of this substance to color production can be verified.—*Jour. N. Y. Botan. Garden.*

ON January first the long established *Botanisches Centralblatt* became the property of the Association Internationale des Botanistes. This journal, as is doubtless well known, was established for the purpose of furnishing abstracts of current botanical literature, but there had been no organized effort to make these abstracts promptly or thoroughly. It has now been entirely organized with corps of editors in various countries, who will see to it that botanical papers are noticed promptly. The American editors are D. H. Campbell, C. J. Chamberlain, D. T. McDongal, G. T. Moore, D. P. Penballow, H. von Schrenk and Wm. Trelease. The abstracts will be published in the language in which they are written.

THE February number of *Forest Leaves* contains two fine, full page plates of the crab apple (*Pyrus coronaria*), and a short account of it as it is found in nature.

MR. J. B. HATCHER has recently published [Annals of the Carnegie Museum, Vol. I., 263], a short account of a supposed new fossil palm (*Sabal rigida*) from the Laramie (Upper Cretaceous) of Converse County, Wyoming. It was found in association with the huge horned dinosaurs which are so abundant in the region.

THE examination of the Mount Rainier Forest Reserve, Washington, together with the Mount Rainier National Park, Washington, by Mr. Fred. G. Plumer, forms part of the report on Forest Reserves, by Mr. Henry Gannett, Geographer, in the Twenty-first Annual Report of the United States Geological Survey now passing through the press, but not yet published.

The Mount Rainier Forest Reserve includes the crest of the Cascade Range, in southern Washington, with its slopes upon the east and the west. Of the the total of 2,146,600 acres, 41.4 per cent. lies on the eastern slope, and 58.6 per cent. on the western slope of the mountains.

All of the eastern slope and most of the western slope, 83.6 per cent. of the Reserve, are drained by 13 rivers into Columbia River: the remainder is drained by three rivers into Puget Sound. The reserve includes the great volcanic peak of Mount Rainier, 14,526 feet; Mount Adams, another great volcanic cone, 12,470 feet; Goat Mountain, 8,500 feet; and Mount Aix, 7,623 feet. From these heights the land sinks down to within a few hundred feet of sea level. The bold topography of the reserve is the cause of wide diversities in climatic conditions. The rain-bearing clouds, borne on southwest winds, pass easily through breaks in the Coast Range to the heights and valleys of the Cascade Range. Hence the strong contrast between the corn and tobacco fields of the Cowlitz Valley and the 32,500 acres of glaciers and perpetual snow fields of Mount Rainier. Only about 45,000 acres, or 2 per cent. of the entire reserve, are fair farming land, and more than one-half of this is too high or too much exposed.

This region, in respect to its forest cover, is sharply divided into two parts by the crest of the range. Upon the west the forest is that of the Pacific Coast, with very dense undergrowth. It is very heavy up to altitudes of between 3,000 and 4,000 feet, where it begins to thin, and above 6,000 feet it is almost entirely wanting. The forest is composed, in the main, of red fir, with some spruce, hemlock, and cedar. It is heaviest in the valleys and upon the north slopes of the ridges, rather than upon the south slopes. East of the crest of the range the forest is comparatively light and open, with little underbrush, and is composed almost entirely of yellow pine. Mr. Plumer notes that owing to the bold topography of the reserve, and the presence of numerous perpetual snow fields and glaciers, there is no altitude which may be termed a timber limit. Thus upon Mount Rainier the alpine trees reach an extreme limit of about 7,600 feet, but at Goat Peak the same forms are found at an elevation of 8,400 feet.

THE cocoanut is one of the handsomest palms by its long, graceful leaves. It grows luxuriantly as far north as Palm Beach, Florida, and a few specimens may be seen a little above that point. Used to line walks, they present a picturesque scene, the low branches curving gracefully overhead. The nuts and their development are very interesting to observe. As a long time is occupied in the growth of the nuts, they may be seen on the same tree in many stages from small, acorn-like ones to the immense brown-husked fellows, all in large bunches. The flowers, too, for a new crop, may be included in the collection.

It is a matter for concern that there appears to be little or no attempt to propagate cocoanuts in Florida, even though they be for ornamental purposes only. They are far from being so plentiful as they were fifteen years ago.—*Meehans' Monthly for February.*

EDITORIAL.

A FRIEND of the editor has been making, for some years, a collection of newspaper clippings on what he felicitously calls "unnatural natural history," that is, items that have made the rounds of the public press, giving grossly exaggerated, if not wholly incorrect, accounts of various animals and plants. As the gentleman is a zoölogist, his collection is naturally fuller regarding misstatements about animals, but in the same time a botanist might easily have made an equally interesting collection of items on such entertaining subjects as "the man-catching tree," "the wooden flower," "a lignified snake," etc., etc.

The following apparently circumstantial account of the finding of a wonderful orchid, along the Rio de la Platte, may be taken as a sample, "The collector was sitting by the side of a lagoon, near a forest of dead trees which had been choked to death by orchids and climbing cacti. A branch of one of these trees stretched out in front of him and about a foot above the water. Upon the branch were growing many orchids, and among the rest there was one which the collector had never seen before. The sharp lanceolate leaves grew all around the root and radiated from it, and from the centre or axis of the plant there hung a long tape-like stem, about an eighth of an inch thick and a fourth of an inch wide. This stem hung down in a graceful curve, and about four inches of it were under the surface of the water. On going up to examine the new specimen, the discoverer touched the leaves, and was astonished to see the centre stem convulsively coil itself into a spiral like the spring of a watch. On close examination and dissection it was found that the stem was a long, flat tube with an opening at the outer end and connected at the inner end with the roots by a series of hair-like tubes. By observation it was found that the purpose of this stem was to supply water to the roots. When the plant is thirsty the proboscis is gradually uncoiled and lowered until the tip is filled with water, then it is gradually coiled up again, carrying with it the water, which, as the last coil is made, trickles out upon the root at the other end."

A good deal of attention is given to ascertaining the accuracy of current news items by the daily press, but when it comes to scientific matters all editorial supervision appears to be removed, and anything, so long as it is "interesting" or "entertaining," in other words, sensational, is allowed to pass. It seems beyond question that those persons who derive their botanical and zoölogical facts from the average newspaper acquire a varied lot of misinformation. In the language of one of our distinguished humorists, "It is better not to know so much than a whole lot that ain't so."

BOOK REVIEWS.

HOW TO TEACH ABOUT TREES. By Frank Owen Payne. New York and Chicago: E. L. Kellogg & Co. Price, 40 cts.

This little booklet is one of a series being published under the suggestive title of "How to Teach" Manuals, and contains a number of observations and outlines for study that cannot fail to be of assistance. It is conveniently divided into chapters which treat of the parts of a tree, its ordinary structure, the kinds of trunks and mode of branching. After a number of tree descriptions, in which certain of the more familiar species are mentioned, there are short chapters on the uses of trees, forestry, lumbering, and some famous historic trees. A number of line drawings illustrate many of the species.

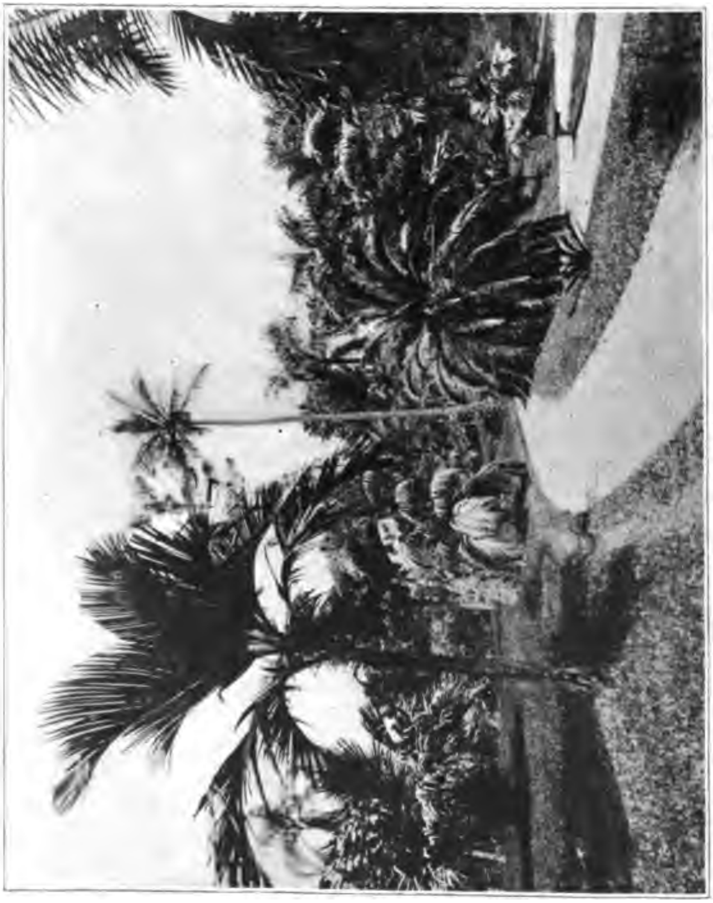
There are a number of statements to which we could take exception, among them the division of woody plants into "bushes, shrubs and trees," the mode of branching in trunks, etc.; but these are perhaps minor defects and will be eliminated by the careful teachers. Altogether the book is calculated to direct attention to our trees and conduce to an intelligent understanding of them. F. H. K.

"TREE PLANTING ON RURAL SCHOOL GROUNDS" is the title of Farmers' Bulletin, No. 134, of the U. S. Department of Agriculture.

This bulletin, which can be had for the asking, should be in the hands of every school teacher and school officer in the country. It should not only be in their hands, but should be carefully read and acted upon. The condition of many of our school grounds is an actual disgrace to a civilized people. There is a very erroneous impression in the minds of many people to the effect that it is the subject matter of dry and dull text books crammed into the youthful cranium that constitutes the all-important element of education. They forget or fail to realize the fact that the surroundings of a child greatly influence its mental and moral development. That children, spending their early years in school rooms surrounded by grounds devoid of grass, shrubs or trees, should be found lacking in the finer imaginative and æsthetic qualities is scarcely to be wondered at.

Failures have often attended laudable attempts to grow trees and shrubs because of the lack of knowledge of the best kinds and the proper method of planting them. In the bulletin under consideration full and clear information is given in regard to these matters. We trust the distribution of this publication will lead to the much needed improvement, not only of rural school grounds, but of rural homes.

C. L. S.



Palmetum, Castleton Garden, Jamaica.

THE PLANT WORLD

A MONTHLY JOURNAL OF POPULAR BOTANY

Vol. V. MARCH, 1902. No. 3.

AMERICAN BOTANICAL GARDENS.

II. THE BOTANICAL GARDENS OF JAMAICA.*

BY JOHN W. HARSHBERGER.

SITUATED in the heart of a charming tropical region is located the Government Botanic Garden at Castleton, twelve miles from the north coast of Jamaica and nineteen miles from the capital, Kingston, on the south coast. This garden, the finest on the island for tropical vegetation, is most easily reached from the Jamaican Colonial Railroad by stopping off at Annatto Bay, and taking carriage through the hill country to Castleton. Some prefer, however, to take the drive of nineteen miles from Kingston, which can be done by hiring a carriage for the day's trip, which is a long one.

The ride from Annatto Bay and from Kingston is over one of the finest roads on the island. The trip from Annatto Bay, the preferable one, is made along the valley of the Wag Water River. The ascent from the plains is a gradual one. Banana plantations fringed with trees of *Bauhinia variegata* are passed on the plains of the Wag Water, just outside of the town of Annatto Bay. As the ascent begins, immense silk cotton trees (*Eriodendron anfractuosum*) stand buttressed by their flat stem-props in the fertile soil of the upland plains at the foot of the hills. These trees, with huge, horizontal branches, are loaded down with a luxuriant growth of tropical epiphytes and lianes. Tillandsias, orchids, philodendrons, ferns and *Rhipsalis*, *Cassytha*, and *Cereus triangularis* are found perched in such aerial situations. Along the road, now, one encounters the bread-fruit tree (*Artocarpus incisa*), and the jack tree (*A. integrifolia*) in all their luxuriance of growth, and loaded down with heavy fruit. Palms are seen, to add to the confusion of tropical growth, in the following species: *Cocos nucifera*, *Phoenix dactylifera* (sparingly), *Acrocomia sclerocarpa*, *Oreodoxa oleracea*, and occasionally, *Sabal umbraculifera*. The trumpet tree (*Cecropia peltata*), the pimento tree, the chocolate shrub (*Theobroma cacao*), the silk cotton tree, the mango tree (*Mangifera indica*), the star-apple tree (*Chrysophyllum caenito*), help to make up the arborescent growths of the hillsides. The larger trees are hung with festoons of lianes. *Abrus precatorius*, *Entada scandens*, *Philodendron lingulatum*, *P. lacerum*, *Vitis caribaea*, *Passiflora* sp. add to the tangle. At higher elevations, the bamboo, *Bambusa vulgaris*, with its nodding plumes, becomes abundant, and tree ferns belonging to the genera *Cyathea* and *Alsophila* appear at home along the drive-way. *Hibiscuses*, *Lantanas*, *Asclepias curassavica* and *Allamanda cathartica* brighten the uniform, dark green of the mountain sides with bright spots of color. A pen description cannot convey any adequate idea of the luxuriance of the tropical vegetation and its wealth in forms of interest to the botanist, as one proceeds along the highway to Castleton.

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* The first article of this series was published in Vol. V, No. 1. Though Jamaica is not an American possession, it forms a part of the American continent, and we have therefore decided to include Prof. Harshberger's interesting paper.—ED.

Castleton is situated in a deep valley, entirely surrounded by lofty mountains, through which flows the Wag Water, foaming and tumbling about like a true mountain stream. Nature has made a garden of this vale. Its soil is rich and fertile, its climate never cold, nor even uncomfortably hot, the mean temperature being 75°, and the rainfall 109 inches annually, hence the relative humidity is comparatively high, especially during the summer months.

In 60, the Legislature appropriated money for the purchase of the site, and Nathaniel Wilson, the island botanist, was entrusted with the formation of a garden there. In some respects, the choice of location was unfortunate, because of the distance of Castleton from Kingston and from the Colonial Railroad. However, it is a place of natural advantages and beauty. Here bloom a large assortment of native and imported orchids. India, the far distant islands of the Pacific, tropical Africa and America have contributed each their quota of valuable food plants, medicinal trees, palms and herbs. There is an experimental ground for novel economic plants. Kola nuts, cacao, olives, sugar-cane, rubber-plants, nutmeg, clove, black-pepper, mangoes, vanilla, pineapples, etc., are under observation here. Taste and skill have succeeded in arranging these trophies in a pleasing manner, and convenient benches afford the visitor the comfort necessary in much sight-seeing. Along the river bank are cool arbors amid groups of bamboo trees. This is a favorite resort for picnic parties.

At the principal gate stand guard two graceful cohune palms (*Attalea cohune*), and nearby one of the most superbly beautiful of all trees, *Amherstia nobilis*, which when in flower in the spring is worth crossing the ocean to see. Further on we see *Norantea guianensis*, climbing over a large tree, and brilliant with long spikes, not of flowers but of nectar-secreting bracts; *Mesua ferrea* attracting attention by the red color of the young drooping foliage; the mangosteen, with its delicious fruits; the travelers' tree of Madagascar: *Araucaria excelsa* from Norfolk island The palmetum contains specimens of 180 species of palms, with great variety of graceful forms. The more important palms of this collection are here enumerated: *Areca catechu, Arenga sacharifera, Astryocaryum vulgare, Attalea cohune, Carludovica gracilis, Cocos flexuosa, Cocos nucifera, Cocos plumosa, Copernicia cerifera, Diplothemium caulescens, Elaeis guineensis, Livistona australis, L. Chinensis, Manicaria saccifera, Mauritia flexuosa, Maximiliana martiana, Oreodoxa regia, Phytelephas microcarpa, Raphia ruffia, Raphia taedigera, Sabal palmetto* and *Thrinax parviflora.* The water lily tank is also an attractive feature of the garden.

Nearby, maintained by the United Fruit Company, is a collection of cottages under the competent charge of Mrs. H. Feurtado, called Castleton Cottages. Here desirable board and lodgings may be had by persons desirous of spending some time surrounded by tropical nature.

Hope Botanic Garden is situated in the Liguanea plain between five and six miles from Kingston at the base of the hilly country, easily reached by electric trolley car from the center of the capital. "The plain of Liguanea is one of the dry districts, the average annual rainfall at Hope being only 51.5 inches" [contrast rainfall at Castleton]. The vegetation consequently presents a different aspect from the country surrounding Castleton. "The plain is characterized by the presence of Cactaceae, such as various species of *Cereus* and *Opuntia.* The trees include *Prosopis juliflora* (cashaw, or the mesquite of the mainland), *Guiacum offiicinale* (lignum vitae), *Parkinsonia aculeata* (Jerusalem thorn). As we approach Hope, at the base of the hills, the rainfall increases from 38 inches in Kingston, and *Catalpa longissima* (the yoke wood tree), and *Pithecolobium saman* (the guango) occur." From being at first a small nursery and an experimental ground for sugar cane, it has now developed into a large garden, with six acres of lawns, three and one-half acres of borders, also ferneries and orchid shelters. The planted grounds are extensive and planted with palms and other large trees capable of withstanding the climate. The trial grounds are planted to various races of sugar-cane, mangoes, chocolate, pineapples, and plants suited for cultivation in the yards of the humblest character. It is the desire and aim of the director, Dr. William Fawcett, to make Hope Botanic Gardens the great emporium, or distributing center, for the West Indies. In this plan, he has only partially succeeded for lack of financial support from the Government. As it is, about 40,000 plants are sent out each year. The director has a residence and office conveniently located, and in a large two-story porticoed building repose the herbarium, library, museum and research laboratory. The herbarium is rich in tropical plants, especially Jamaican forms, and is well maintained. The library is well supplied with all of the more important "floras" and recent botanical works. The museum contains alcohol specimens of plants, and a representative collection of woods. The laboratory seems bare, but is supplied with a few dissecting and compound microscopes, and some of the requisite reagents for microscopic work.

Two other gardens merit a short description. King's House Garden, 177 acres in extent, is located about the residence of the governor, and is but a short distance by trolley car from Hope Gardens. The avenue from the entrance gate to the house is formed of the willow fig (*Ficus benjamina*) and the royal palm (*Oreodoxa regia*), with borders of ornamental shrubs and creepers, such as *Crotons*, *Hibiscus*, *Acalypha*, *Tabernaemontana*, *Mussaenda*, *Tinnea*, *Bambusa*, *Dracaena*, *Musa* ,*Bignonia* and *Stephanotis*. In the garden about the house are many noteworthy trees and plants.

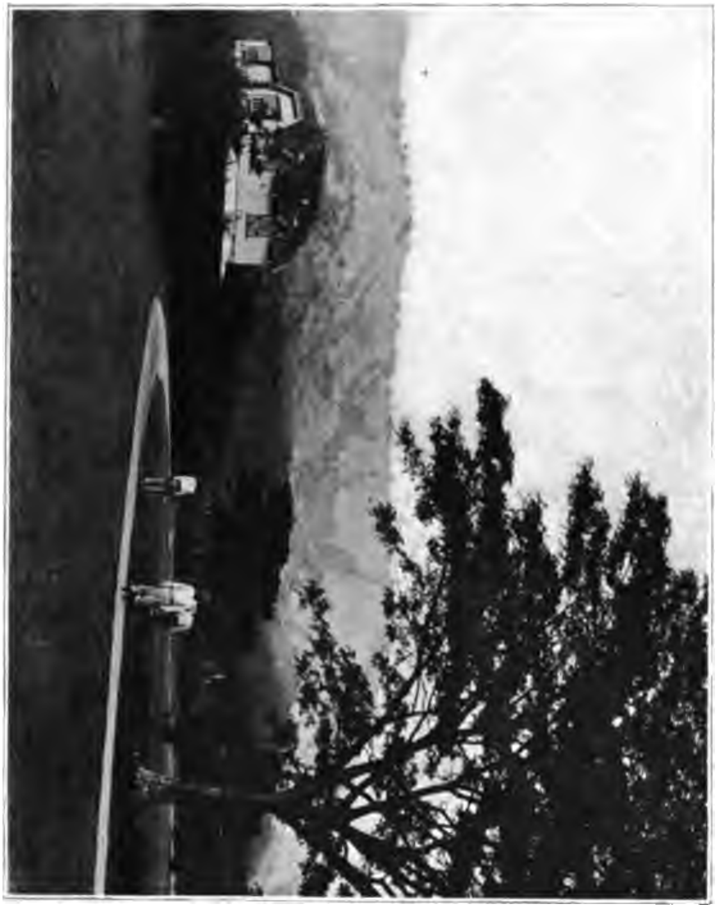
Hill Garden, or Cinchona, as it is generally called, is located in the Blue Mountains between New Castle and Abbey Green, at an elevation ranging from 3000 to 6300 feet, so that greatly varied experiments can be made in cultures requiring different altitudes.

If the writer dared to make a prophecy, he would give as his opinion that Hill Garden is destined to become the chief botanic garden of the island, even to the abandonment of Castleton and Hope Gardens. The climate is more favorable to continued labor on the part of white men. Timber trees have been planted out and tended for years, and a knowledge gained of the capabilities of different trees for use in the hills. The several medicinal species of *Cinchona* have been found to do well here. Fodder plants have been experimentally dealt with, as well as many different kinds of economic plants. An experimental coffee and orange plantation has been started, which may prove of ultimate advantage to the plants of Jamaica.

A visit to any of these gardens cannot but prove a revelation to the visitor unfamiliar with the tropical vegetation out of doors. Under the able management of Dr. William Fawcett, at Hope, seconded by the intelligent direction of Mr. W. G. Thomson, at Castleton, the botanic gardens of Jamaica have become important botanic centers.

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.

THE PLANT WORLD. VOL. V. PLATE IX



Hope Botanic Garden, Kingston, Jamaica.

LEWIS DAVID VON SCHWEINITZ.

A BIOGRAPHICAL SKETCH.

BY C. L. SHEAR.

IT is only quite recently in this country that one has been able to secure a livelihood by following botany as a profession. During the first half of the past century nearly all the botanical work was done by physicians, clergymen and members of other professions who, being lovers of nature, devoted all their spare moments to her study and laid the foundations of botanical science in this country. Among the most noteworthy of these men was the subject of this sketch, who was born at Bethlehem, Pa., February 13, 1780. His parents were Germans, belonging to the sect known as the United Brethren, which has exercised such good influence in portions of Pennsylvania since early in its history. His father held an important position among the Brethren, being superintendent of the fiscal and secular concerns of the fraternity. His early associations and training were characterized by purity and simplicity. While very young he showed an enthusiastic liking for study, and when his teacher exhibited and explained to him some natural history specimens his latent interest in the subject was immediately evinced.

At the age of seven he was placed in the Moravian School at Nazareth, Pa., where he continued his studies for eleven years. Here his interest in nature, and especially botany, increased and developed under the direction of Mr. Kramtch, who was teacher of this subject. It must not be inferred, however, from this that natural science was given any very important place in the curriculum; most of the time was devoted to the classics and religious subjects. The lad, however, improved every opportunity to collect and study the plants of the vicinity, and undertook the preparation of a flora of Nazareth, which was not finished, however. He progressed so well in all his studies that he was soon given charge of some of the junior classes in the Seminary.

When Lewis was 18 years old his father was called to Germany on business. His family accompanied him and the young man was placed in the Theological School at Niesky to continue his studies, as he was expected to enter the ministry. Here he came under the influence of Prof. J. B. de Albertini, the botanist, by whom his attention was first turned to the study of that numerous but much neglected group of plants, the fungi. He pursued the subject with much enthusiasm, many undescribed species were found, and as joint author with Albertini[1] a work was written describing the fungi of the region. It was illustrated with twelve excellent colored plates prepared by Schweinitz.

About this time he began preaching at Gnadenburg, Silesia. From there he went to Gnaden, where he was pastor until 1812, when he was appointed by the Brethren general agent of the church in the southern states. Before leaving Germany he married Louisa Amelia LeDoux.

While on the way to America some time was spent at the University of Kiel, where he received the degree Ph. D. Pursuing his journey to this country, which was reached after a tempestuous voyage, he settled at Salem, North Carolina, where the United Brethren had an establishment. Here he devoted all his spare time to the study of the fungi of the region, and published as the result in 1818 his Synopsis of the Fungi of North Carolina[2]. The same year his business necessitating a visit to Germany, he improved the opportunity to establish correspondence with the leading systematic botanists of Europe.

Upon his return to America he began the formation of the magnificent herbarium which is now in the possession of the Philadelphia Academy of Natural Sciences, and contains types of most of the species described by him.

In 1821 he published a pamphlet on the "hepatic mosses"[3], and the same year a monograph of the genus *Viola*. At the close of this year he returned to Bethlehem, Pa., as general agent for the Brethren and Superintendent of the Institution for the Education of Females. Here he diligently pursued the collection and study of fungi, most of his work being done in the vicinity of Bethlehem and Nazareth. He carried on correspondence and exchange with Fries, Steudel, Brongniart, Ledebour, Hooker, Martius and others, whose specimens enrich his collection. The value of his botanical work was recognized by his election as honorary member of various scientific societies in this country and Europe. As the result of his studies at this time he published several papers, one being a monograph of that difficult genus, *Carex*[8].

In 1824 he made another visit to Germany, returning the same year. From this time he devoted most of his effort to the collection and description of the material which formed the basis of his most important publication, the Synopsis of North American Fungi [10]. Always physically frail, in 1830 he was taken with a severe cough, and his health continuing to fail, he made a journey to Indiana, from which he derived some benefit, but suffered a relapse and died February 8, 1834, leaving his wife and four sons.

Personally Schweinitz is described as a retiring but most genial and lovable man. He was honored and respected by all with whom he came in contact. As a result of his botanical work, he published about 1400 new species, mostly fungi. Owing largely to the imperfect facilities for study which he possessed, numerous corrections in his work are necessitated in the light of our present knowledge. As a pioneer,

Lewis D. Schweinitz

however, in the study of our fungus flora he must always hold an honored place.

The following is a list of the botanical publications of Schweinitz, for which, as well as for the facts given above and the accompanying portrait, I am indebted to a memoir of Schweinitz prepared by Walter R. Johnson, and read before the Academy of Natural Sciences of Philadelphio, May 12, 1835.

1. Conspectus Fungorum in Lusatiae, Superioris Agro Niskiensi Crescentium. 412 pp., 8vo., 12 pl. Leipsic. 1805.
2. Synopsis Fungorum Carolinae Superioris. 105 pp., 4to., 2 pl. Leipsic, Soc. Nat. Cur. Comm. 1818.
3. Specimen Florae Americae Septentrionalis Cryptogamicae. (Containing the Hepatic Mosses.) 27 pp., 8vo. Raleigh, N. C. 1821.
4. Monograph of the Genus Viola. 34 pp., 8vo. Silliman's Journal, Vol V., p. 48. 1821.
5. Plants Collected during Long's Second Expedition. 21 pp., 8vo. Keating's Nar. of Long's 2d Exp. Vol. II. Phil. 1823.
6. Analytical Table to Determine the Carices. 10 pp., 8vo. Ann. New York Lyceum. Vol. I. 1823.
7. List of Plants of Easton, Pa. 2 pp., 8vo. Silliman's Jour. Vol. VIII. p. 267. 1824.
8. Monograph of North American Carices. 90 pp., 8vo., 6 pl. Ann. New York Lyceum. Vol. I, p. 283. 1824.
9. New American Species of Spheriae. 14 pp., 8vo., 2 pl. Jour. Acad. Nat. Sc. of Phil. Vol. V., p. 3. 1825.
10. Synopsis Fungorum in America Borealis media degentium. 177 pp., 8vo., 1 pl. Trans. Am. Phil. Soc. of Phil. n. s. Vol. IV., p. 141. 1831.

JOHN STUART MILL AND BOTANICAL STUDY.

By E. J. Hill.

IN the Autobiography of Mill is an account of the way he became interested in botany and of its advantages to him in literary work. His father, James Mill, was a friend of Jeremy Bentham, the well-known publicist and advocate of the utilitarian philosophy. This led to an acquaintance with General Sir Samuel Bentham, a brother of Jeremy and father of George Bentham, the botanist. Sir Samuel had an estate in the south of France, to which young Mill was invited for a visit of six months in 1820. By the kindness of the family it was prolonged to nearly a year. Under the influence of George, his senior by six years, Mill then being fourteen, he took up the study of botany. He also attended a course of lectures on zoölogy and chemistry at the neighboring College of Montpellier, which doubtless bore fruit of a similar character, though his taste in after years seems to have been chiefly confined to botany.

It is in connection with Jeremy Bentham's procedure that Mill refers to the benefits he derived from this study. Bentham had applied in a scientific form the happiness principle of the utilitarian philosophy to the morality of actions, taking up their consequences under various classes and orders and analyzing them. He was most of all struck by it in the classification of offences. "Logic and the dialectics of Plato, which had formed so large a part of my previous training, had given me a strong relish for accurate classification. This taste had been strengthened and enlightened by the study of botany on the principles of what is called the Natural Method, which I had taken up with great zeal, though only as an amusement, during my stay in France; and when I found scientific classification applied to the great and complex subject of Punishable Acts, under the guidance of the ethical principle of Pleasurable and Painful Consequences, followed out in the method of detail introduced into these subjects by Bentham, I felt taken up to an eminence from which I could survey a vast mental domain, and see stretching out into the distance intellectual results beyond all computation."*

Mill refers to this subject in another work, his "System of Logic." In the fourth book of this treatise the operations subsidiary to induction are considered under various heads, including those on the language of science, meaning of terms, terminology, nomenclature and classification. Here, as well as in other places in the work, Mill shows how he made use of his botanical acquisitions by frequent examples employed to enforce his ideas, though other branches of natural science are also placed under tribute. Having stated in one of his chapters that the scientific arrangements of organic nature have hitherto afforded the only complete examples of the principles of classification, and are just as useful in art, business, or other matters, in bringing the parts of an extensive subject into mental co-ordination, he closes with the following significant passage: "The proper arrangement, for example, of a code of laws, depends on the same scientific conditions as the classifications in natural history; nor could there be a better preparatory discipline for that important function than the study of the principles of a natural arrangement, not only in the abstract, but in their actual application to the class of phenomena for which they were first elaborated, and which are still the best school for learning their use. Of this the great authority on codification, Bentham, was perfectly aware; and his early *Fragment on Government,* the admirable introduction to a series of writings unequaled in their department, contains clear and just views (as far as they go) on the meaning of a natural arrangement, such as could scarcely have occurred to any one who lived anterior to the age of Linnaeus and Bernard de Jussieu."*

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*Mill's Autobiography, p. 65.

The method followed by Mill in his study of botany was the analytic. He was chiefly concerned, at the beginning, at least, with the identification of plants. Bentham himself had already used it. Under the inspiration of his mother, an ardent devotee of the science, he became interested in the analytical tables which formed a part of De Candolle's edition of Lamarck's Flore Francaise. Trying by means of them to name every plant he saw as they traveled in France, he began his botanical career. De Candolle took an analogous course. Without books at first to name his plants, for two years he wrote out descriptions of those he met with, and found when he came to use the work of Linnaeus to obtain their names, that he had discovered certain natural relations which were disturbed by the artificial system of the Swedish master. Henceforth the "Systema Plantarum" became to him "a simple dictionary."† Goethe's way was similar to that of Mill. In an autobiographic sketch of the studies that led to the writing of his "Metamorphosis of Plants," he tells how enthusiastic he became in the study under the influence and direction of young Dietrich as they journeyed across the mountains from Weimer to Karlsbad, collecting and naming the plants they saw along the road.

The importance of the study, as a means of mental discipline, aside from teaching the habit of observation, chiefly lies in the value that must be given to evidence. Facts, often of the most delicate nature, must be weighed to come to a decision. The same process has to be followed, not only by the judge and the statesman, but by those in all the walks of life. Failing to give the proper value to evidence may result in success or disaster, and as far as facts are involved, whatever disciplines the mind for this will be of the greatest benefit in imparting mental habits. It means a knowledge of plants in their structure and work, their relations to their environment, if possible to the minutest details, and the co-ordination and arrangement of this knowledge in a system. As far as it goes, it is in kind the same process to him who can dip but lightly into the science as to him who searches its profoundest depths.

CHICAGO, ILL.

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*Mill's System of Logic, p. 511 (Harper's edition).

†A. P. De Candolle's Mémoires et Souvenirs. Paris, 1862, p. 37.

BRIEFER ARTICLES.

DERIVATION OF DOG'S-TOOTH LILY.

(DOG'S-TOOTH VIOLET.)

BY GRACE STODDARD NILES.

That old proverb, "What's in a name!" is not applicable to botanical nomenclature, for one might ask rather, what is there that is *not* in a name!

A suggestive derivation of "Dog's-tooth," curiously presented among the "Briefer Articles" in THE PLANT WORLD for January, 1902, is based upon the author's imagination, the seeds of this lily reminding him of an animal's teeth. As I possess the only extant English translation of the "History of Plants," published by Doctor Rembert Dodoens in 1578, I may give the true origin of "*Dog's-tooth*" in part. The Latin, *dens-canis*, for dog's-tooth did not have its birth in 1753, with Linnaeus, as is commonly supposed. Linnaeus himself may scarcely have known where he really obtained either the generic or specific designation. As far as I am able to discover, the origin of the present generic name, *Erythronium*, signifying *red*, was taken from a former specific name of an ancient species of *Orchis* (*Satyrion Erythronium*). *Satyrion* and *Orchis*, in Greek, mean virtually the same. *Satyrion*, the ancient shop name, was derived from the Greek *Cynorchis*, which becomes in Latin, *Testiculus canis*, and in English the common names are satyrion, dog's cullions, standergrass, ragwort and adder's grass.

Dog's-tooth lily produced roots good for the "teeth," used in Dioscorides' day, 400 B. C. The red-spotted leaves of this plant being similar to species of *Orchis* or *Satyrion*, became confused, therefore, with red satyrion as observed, and the corruption of names, "dog," (*canis*), and "teeth" (*dens*) originated "dog's-tooth," the common name for *all* species of *Erythroniums*.

Dodoens in 1578 wrote of this lily: "This herbe is now called *Denticulus canis*, and *Dens caninus;* of some it is also called *Pseudohermodactylus*, of others, *Satyrion Erythronium*, wherewithal, notwithstanding it hath no similitude, but seemeth to be *Ephemeron non lethale*, of Dioscorides, which is also *Lilium Sylvester ;* (a wild lily), and it may well be called *Lilium Sylvester*, because that floure when as it hangeth douneward toward the grounde is much like lillies saving it is ever smaller." The "two leaves speckled with great red spots, the tender stalke, with one floure, like the wild lily, of colour white, pale purple, like to a carnation or flesh colour; out of the midst of this floure there hang six small throms or short threds, with little titles or pointed notes, like as in the Lillies." "The roote, long and slender, like to a The-ball with certaine hairy threds or strings hanging at it." The seed capsule is also mentioned "as a rounde knop or little head, in which the seed is contained." There is no allusion to the seeds, reminding the ancients of dog's-teeth. However, "of the nature and vertues," continues Dodoens, "we can affirme nothing, but *if* it be *Ephemeron non letherel,* known as *Lilium Sylvester* of Dioscorides, as *it* seemeth to *be,* then it *is* good for the *teeth,* as Dioscorides saith: as he writeth, the water wherein the rootes is boiled is wholesome, and especially good for the teeth."

The designation of "dog's-tooth violet" is of later origin, and at least *is* a misapplied name given this lily, by children, since it blooms in early spring time with violets, marsh marigold and arbutus. Therefore the common name, *dog's-tooth lily* (*Erythronium*), known to the ancients before Christ, should be re-established according to a moral rule of priority for common names in the Illustrated Flora of North-eastern North America (page 420), 1896, where it was purposely dropped by the authors. Dog's-tooth "*violet*" was misleading, yet "yellow adder's tongue," the present designation, is quite as incorrect, having originated before Pliny's day from the Latin *Lingua Serpentis,* and becomes in English adder's tongue. This name applies more especially to a fern described as "producing one leaf a finger long, bearing a little tongue like a serpent.". Linnaeus knew this plant in 1753 as adder's-tongue (*Ophioglossum vulgatum*). The name "adder's-grass," however, was a common English designation for a species of *Orchis* or *Satyrion,* which may have been applied to *Pogonia Ophioglossoides* later, now commonly called snake-mouth.

Satyrion Erythronium or *Dioscorides Satyrion* was also known as red satyrion, and produced leaves "somewhat broad like lilies, and somewhat red." "The stalke bare and naked, halfe a foote high, produced white flowers at the top like unto lillies." This plant had "a bulbous or rounde roote like an apple, of a fiery yellow or *reddish* colour without and white like the white of an egg within, of a sweete taste." Thus originated the *Erythroniums,* the *Red Satyrion* of the ancient Syrians.

Professor Gray formerly called attention, in his Manual (1887), to "the *dog's-tooth violet*" "producing three inner sepals," "usually with a callous tooth on each side of the erect base, with a groove in the middle."

Lilium Sylvester, likened to a "dog's-tooth" by Dodoens, "produced rootes of divers kinde, and many hanging together, like the rootes of yellow Daffodiles, saving they be greater and thicker." The "lilly-floures" were "yellow, darke red or purple."

There is still a certain vagueness surrounding the origin of the "dog's-tooth lily." I have not attempted, therefore, to imagine new names, since the ancient ideas are confusing enough at best!

The mystery of the appended "violet" will, I fear, never be cleared away. Names ignorantly coined often outlive the identity of the species themselves, especially if they are bad names. The history and origin of both common and scientific plant names certainly enhances the pleasure of nature-students afield and should be encouraged.

To me, the meanest flower that blows can give,
Thoughts that do often lie too deep for tears.

Flowers are treasures that we associate with innocent childhood; they are the tokens of our finer feelings, the voicings of our innermost soul, and intone the spirit of our being.

WILLIAMSTOWN, MASS.

THE DOG'S-TOOTH VIOLET.

In the January number of PLANT WORLD, there is a brief article by W. E. Safford, regarding the name "Dog's-Tooth Violet." His explanation of the name is based upon the appearances of the seeds as they lie in the ripened capsule, but he points out the fact that the Germans (the French and Italians also) have a similar name for the European species, which does not have seeds of the same form as the American, and, therefore, cannot give the same appearance when seen in the ripe capsule. As a matter of interest, it may be said that the earliest botanies, aside from the early Greeks, speak of the *Erythronium* as "dog's tooth" with or without the added word "violet." It is commonly known that the early herbalists named many of the plants they described from associations either in form, time or neighboring plants, regarding but little the individual characteristics of the plant in hand. In one of the old botanies in the library of the Agricultural Department, there is a colored plate, illustrating the European species with the name *Viola dens-canis*, with pen notes, giving the later and more modern names also. This is, so far as found, the only picture of the plant with its full common name recognized as its scientific name. The name is derived, as stated in several of the old herbals, from the form of the bulb of the European plant, which resembles very closely the shape of a canine tooth from a carnivorous animal, hence "dog's" tooth. The "violet" part of the name is probably due to the blossoming time and the association in growth, which made the *Erythronium* and violets appear in close proximity both in time and region. If Mr. Safford would like to know of other names which have been applied to the *Erythronium*, he may be interested to read the Bulletin of the Torrey Botanical Club for June, 1900, in which there are quotations from several of the old herbals, giving the names used in them for this plant.

FREDERICK H. BLODGETT.

IS THE GIANT CACTUS DOOMED?

In your January issue you quote from the Phœnix, Arizona, correspondent to the New York *Sun*, as follows:

"The bringing of water to the arid wastes of Arizona and the consequent evolution from desert to garden is causing the extinction of one of the strangest plants in the world [*Cereus giganteus*]," etc.

I cannot but take a different view from that of the *Sun's* correspondent. I doubt that we can properly say that the plant is becoming extinct. Where I have seen this gigantic cactus it grows in places where irrigation will always be impossible. In the Gila River Valley, in Arizona, irrigation is extensive, causing the land on either side of the stream to blossom as the rose. But the habitat of the giants is not in the valley. On the high sandy or rocky mesas, and on the sides of dizzy, barren, sun-burnt cliffs and peaks, where irrigation will not only always be impracticable but unthought of as well, there must one go to observe the great cactus.

A few miles north of San Carlos, Arizona, are the peaks called the Triplets; within their fastnesses the *Cereus* flourishes in abundance. Four or five miles to the northwest of the station mentioned, may be seen the Flatirons, a series of flat-topped tablelands of limited surface-area. Upon these tablelands, also, the giant makes its home; and such elevations are common enough in Arizona. In short, one must leave the lower levels, whether irrigated or no, and seek the higher points, in order to see the plant under our consideration. It is true that our observer says "only in spots where water cannot be got can the odd plant be found." But anyone who has visited the southwestern parts of our country need not be told that the "spots where water cannot be got" are quite numerous and of considerable size. Arizona is a mining country and, as such regions usually are, is rough and mountainous; a very small per cent. of her area will ever be converted into gardens; and as far as my observations go, the garden-levels are not the natural habitat of the giant cactus. It appears to me that the article in the *Sun* is a piece of newspaper natural history of the too-common kind. H. TULLSEN.

GENERAL ITEMS.

APROPOS of your recent discussion of *Trillium* sports it may be of interest to note that I collected in Plymouth, N. H., a specimen of the painted trillium (*T. erythrocarpum* of Gray's Manual) with the parts all in 4 instead of three: 4 leaves, 4 sepals, 4 petals, 8 stamens, 4-parietal ovary. A. J. GROUT.

THE Seventh Annual Winter Meeting of the Vermont Botanical Club, held at Burlington, January 24th and 25th, was in every way a most successful meeting. Among the twenty-three papers presented were interesting accounts of small botanical gardens, notes on mushrooms and ferns, a report on the maple sap problems, a study of the flow of nectar as measured by the honey bee, and observations on bacterial diseases of plants. The subjects of nature study and forestry received considerable attention. The address by Professor Robinson, of Harvard University, on Some Recent Advances in the Classification of the Flowering Plants, outlined the history of various schemes of classification and furnished a most interesting account of the Engler and Prantl system.

February 10, 1902. TRACY E. HAZEN.

ONE of the most valuable woods in eastern Cuba for general building purposes is afforded by a species of *Thrinax*, or thatch palm, growing along the north coast. The trunk is rather slender and of uniform dimensions throughout; while the wood is so exceedingly hard as to defy the average axe. Poles of this wood set in the ground over fifty years ago exhibit no sign of decay.

IT is not necessary to visit the Philippines or Eastern Asia to see the real bamboo in its native home, although, of course, that quarter of the world is the main center of distribution for the arborescent grasses known by this name. But the Cuban bamboo, particularly in Santiago province, is frequently met with along arroyos and streams attaining a height of from forty to sixty feet, with stems at the base nearly as thick as a man's leg. It grows in immense clumps, branching out above into numerous feathery divisions. The stems are of great use to the Cubans, being employed as fence posts, house frames, etc., and in short lengths as water vessels.

MOST Cuban fences enjoy the unique distinction of being alive, and of throwing out spikes of flowers at certain seasons. This is not because the posts take root after the manner of willows, but because the fence consists of rows of growing plants. The species universally employed for this purpose is one of the pineapple family known as the pinguiella (*Bromelia Pinguin*). It has pineapple-like leaves with very sharp recurved prickles, and as it suckers freely from the root it very promptly forms a hedge impervious even to the itinerant pig. The red spikes of flowers are succeeded by a yellow berry-like fruit of a not unpleasant flavor.

THE so-called calla lily, now so widely known in cultivation, is a native of the Cape of Good Hope. Following is a short extract from an article in *Gardening* on the "Native Flowers of South Africa," in which the home of the calla is described: "In Cape Colony, for many miles between Paarl and Cape Town, the line is bordered with so-called 'pig-lilies.' These are none other than our carefully tended and garden-produced arums or callas. But in South Africa they grow wild and in luxuriant profusion. Near Ceres there are great fields full of these snowy white blooms with their orange yellow spadixes."

A NEW station for the interesting plant known as rose-root, or *Sedum roseum* (the *Sedum Rhodiola* of Gray's Manual) has recently been recorded by Arthur N. Leeds, of the Philadelphia Botanical Club. Mr. Leeds discovered it in some abundance last summer growing along the upper Delaware River near Port Jervis. Only two Eastern stations are known for the plant south of this; one of these being in Bucks County, Pennsylvania, and the other on Roan Mountain, North Carolina.

C. F. SAUNDERS.

THE largest and most valuable collection of orchids upon the Pacific coast, and one of the best in the United States, is that of John C. Siegfried, Alameda, Cal. For years this collection has remained little known, even to the people of Alameda, but hereafter it is to be open to the inspection of the public. Here are gathered 2760 plants, including some 170 varieties, among them many rare things which could scarcely be duplicated. Mr. Siegfried places the value of the collection at not far from $70,000. F. O. Vincent is the gardener in charge, having been on the place six years. Prior to that he spent six years in charge of the conservatories at the Golden Gate Park, San Francisco.—*Californian Floriculturist*.

NOTES OF CURRENT LITERATURE.

THE Jamaica Board of Agriculture has just issued a report by Robert Thomas, formerly Superintendent of the Botanic Gardens, giving an exhaustive account of the manner in which various tropical or semi-tropical fruits are cultivated in Florida. It is intended to supply information for the use of residents of Jamaica on the improved methods of culture now in force in this country, and incidentally pays a high compliment to our students of plant-breeding.

THE U. S. Department of Agriculture has in press and will soon issue Bulletin No. 9, Division of Pomology, entitled "The Fig: Its History, Culture, and Curing." It was prepared by Gustav Eisen, Ph. D., and the earliest observations on which the bulletin is based were begun many years ago during a visit of the author to the fig districts of the Mediterranean countries. Later on investigations were made by Dr. Eisen in Mexico, Central America, and California, principally the latter.

The recent successful introduction of the *Blastophaga* into the fig-growing sections of the United States by the Department of Agriculture almost certainly assures the production of first-class Smyrna figs, which will doubtless greatly encourage and stimulate the industry.

The bulletin gives a complete history of the fig and describes in detail the methods of culture and curing.

The first chapter is devoted to the derivation of the name, the home and distribution of the fig industry, and the botany of the fig.

Chapter 2 describes fig culture in Smyrna and Asia Minor, Greece, Northern Africa, Italy, Portugal, France, England, Spain, the Southern States of North America and Mexico.

Chapter 3 relates to fig culture in California and gives an account of the importation of Smyrna fig cuttings by the Bulletin Company of San Francisco in 1880, and the very important importation by the U. S. Department of Agriculture of the whole collection of figs grown in the hothouses of the Royal Horticultural Society of London, the best known collection of figs in the world. The efforts to obtain this collection for the State of California were begun under Secretary Rusk's administration, but were only brought to a successful issue under the administration of Secretary Morton in February, 1895. A history of the importation of *Blastophaga* is also given.

Chapter 4 is devoted to caprification of the fig. This is a practical process based on scientific principles, and has been practiced in some countries from time immemorial. The requisites for caprification as now practiced in California are genuine Smyrna fig trees, two or three varieties of caprifig trees, and colonies of *Blastophaga grossorum* or fig wasps occupying the caprifigs.

The method of caprification, pollination, different types of figs, and insects are described, and the life history of the caprifig wasp is given.

The bulletin also treats of climatic conditions, propagation, pruning, irrigation, diseases, drying, curing, packing, shipping, chemical analysis, statistics, and production of the fig. It concludes with chapters on household recipes, bibliography of figs and tables of temperature, precipitation and humidity in the principal fig regions.

It contains a very complete catalogue of the many varieties of figs, a frontispiece, 15 plates, and 93 text figures.

Country Life in America for February is an enlarged number of this beautiful magazine of the world out-of-doors, representing the new expansion of American life to the country. "In Garb of White," the frontispiece, is a remarkable picture of a New England woods road in winter. Among the leading features are "Skibo Castle," the summer home of Andrew Carnegie in the Scottish Highlands; "A Sniff at Old Gardens," by J. P. Mowbray, who treats of the vestiges of a past home life on the old Hudson River manors. Other articles and superb pictures touch upon every side of country life. "The Trees," is a large plate of rare beauty covering the two central pages of the large magazine. Of gardens and practical garden-making there is "An Experience with the Soil," in which a suburbanite tells of years of enthusiastic work in growing a wild garden of some eighty kinds of flowers, shrubs, and aquatic plants; and there are also articles on the construction and care of the hot-bed, with suggestions for starting vegetables and flowers. A series of photographs is devoted to "The Abandoned Farm Country," where, amid old friends—the marigold, hollyhock and climbing rose—may be found pleasant summer homes, modest, but quite as much the aim of this successful magazine as the ideal country seats.

ALL teachers of botany in secondary schools, as well as those in higher institutions, will find much of interest and usefulness in Class Bulletin, No. 12, of the School of Agriculture, just issued by the Minnesota Experiment Station. It has been prepared, as the authors, Prof. S. B. Green and R. S. Mackintosh, state, as a guide for the use of the classes in the greenhouse laboratory work of the Minnesota School of Agriculture. Notwithstanding the fact that this outline is intended for schools having far greater facilities than the high school teachers, still there is much in the way of information and experiments that could be adopted to advantage. The pamphlet is profusely illustrated with half-tone engravings which add much to its attractiveness as well as usefulness. C. L. S.

THE report for 1900 of the State Botanist of New York, Prof. Chas. H. Peck, has lately appeared. This is a reprint from the 54th Annual Report of the New York State Museum. The author reports 407 species added to the herbarium, 57 of which were not before represented. Twenty-eight species are described as new. Besides the species described as new by Prof. Peck, there are several of the Thelephoraceae mentioned as unpublished species of Dr. Burt, who is at present monographing that family. A line or two of descriptive matter accompanies these names, which raises the question as to whether this should be considered the place of publication of the species or not. We infer that it was not so intended, though one especially familiar with the group might consider these brief notes sufficient for the identification of the species. Besides the notes and descriptions of new species there is a synoptic table of the New York species of *Trametes* and 13 folded plates of edible fungi. We are pleased to note that the author has at last been furnished with more convenient quarters for the herbarium, which has been moved from the corridors of the Capitol to Geological Hall, where it is hoped to be able to make accessible the valuable collections so long rendered useless for lack of space. C. L. S.

EDITORIAL.

THE publishers of THE PLANT WORLD take both pride and pleasure in usurping the editorial chair, for a short period, in order to announce the honor conferred upon our senior editor, Dr. F. H. Knowlton, who has been awarded the first prize by the New York Botanical Garden for the best essay upon the subject of the preservation of our native plants.

As one of the founders of this journal, which has been the pioneer in popular botany, Dr. Knowlton has labored unceasingly for the advancement of the science, and has argued strongly on many occasions for the adoption of more active measures looking toward the preservation of native wild flowers. The reward, therefore, comes with peculiar appropriateness to the head of our editorial staff, and we are sure that our friends will congratulate both Dr. Knowlton and THE PLANT WORLD on the winning of this prize.

The essay, which by the terms of the contest became the property of the Garden, was published in the journal of that institution for March. It will be republished in full in our April issue, and we hope at that time to submit to our readers a plan embodying Dr. Knowlton's suggestions.

THE PLANT WORLD COMPANY.

THERE is no adjective more abused than "popular," in so far as its application to science is concerned; and the varied opinions as to what constitutes "popular" botany, as exemplified in print, are often very amusing. In its proper sense, as we often have occasion to point out in these columns, the phrase really means a presentation of botanical facts in language that can be understood by everyone; but it also means a selection of such facts as are of public interest. Thus an article on the subject of plant names and how they come to be applied is distinctly a popular subject, if well treated; but a dissertation on nomenclature, involving technical questions of priority, etc., while no less scientific, has no place in the columns of a journal of popular botany. On the other hand, if we are obliged to mention any considerable number of plants, it is always better to refer to them by their Latin names; for in many cases they have no others, and if the reader is uncertain as to their identity, he can easily refer to one of our manuals.

These remarks have been suggested by observing the space given in one of our journals of "popular" botany to tedious homilies on the subject of nomenclature, priority, the Rochester code, and similar topics, which must be quite incomprehensible to many of its readers. A book from the same source, also laying claim to "popularity," contains under nearly every species described a statement of the author's reasons for differing with his fellow-botanists in the names he adopts.

The pages of THE PLANT WORLD have never been used for the exploitation of the views of any school of nomenclature, although we have several times been asked to publish contributions on this subject. We strive to procure, first of all, matter of interest to our constituents, who are not interested, we are sure, in technical scientific squabbles; and the nomenclature of every article appearing in THE PLANT WORLD is exactly what the author chooses to make it.

BOOK REVIEWS.

NATURE STUDY AND THE CHILD. By Charles B. Scott, A. M. Cloth. 618 Pages. Price, $1.50. D. C. Heath & Co., Publishers. Boston.

Since the reaction which set in some years ago against the idea that the three R's constituted the essentials of an elementary education was followed by the introduction of Nature Study, two absurd extremes have been reached by different classes of enthusiasts who have taken up the work. The ultra scientific have tried to introduce in the lower grades the methods adapted to college students, while extremists of another sort have substituted fairy tales and legends regarding plants, animals and other phases of nature. As usual, the proper method lies between these extremes. Prof. Scott, with an evident appreciation of the true ends and aims of Nature Study, has given a comprehensive review of the whole matter which should prove very helpful to every earnest and intelligent teacher. It should not be necessary at present to bring forth proofs and arguments to show that Nature Study fills a want in the development of the child that cannot be filled by any other study. The development of the child represents in epitome the development of the race, and as the race in its primitive condition was compelled to contend with nature and become familiar with her ways by careful observation, so the child seems to instinctively feel its close relation to natural objects and usually evinces at an early age an interest in plants and animals.

This early tendency is, however, too often repressed rather than fostered by parents and teachers. This book should tend to advance the cause of Nature Study, and should be in the hands of all teachers. What benefit they may derive from it, and whatever success they may have in their teaching, will depend, however, largely upon their own training and love of nature, without which the highest success in this work will be unattainable. C. L. S.

THE PLANT WORLD

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SUGGESTIONS FOR THE PRESERVATION OF OUR NATIVE PLANTS.*

BY F. H. KNOWLTON.

AS man began to pass from the so-called pre-human state into the human state, he doubtless early made a crude classification of the plants by which he found himself surrounded, distinguishing those that could in one way or another be made useful from those found from experience to be without value, which latter he presumably soon further subdivided into those distinctly harmful and those that were simply without any useful properties. Later, probably as a result of increasing numbers, he was forced to occupy new territory, where he found himself surrounded by new plants and animals of which he acquired knowledge and, when possible, adapted to his needs. It seems beyond dispute that for many centuries early man wandered over wide areas, driven hither and thither in his pursuit of means of subsistence, and so it came to be established that the animals and plants in nature belonged to him who could take and hold them. Notwithstanding the fact that certain prescribed areas came to be recognized as the "hunting grounds" of the individual, the family, the tribe or the nation, countless generations passed before private ownership of the soil was established as we know it at the present day. Plants and animals were, in large measure, common property. But with advancing civilization private ownership became more and more firmly fixed, and carried with it, as a matter of course, jurisdiction over the plants and animals, but as wild animals have ever been held as of greatest importance, laws and regulations governing their disposition have been most prominent. Beyond restrictions regarding forests and a relatively few plants of economic importance, plants as they occur in nature were, and are even at the present day, looked upon largely as common property. It is thus seen to be difficult, indeed impossible, to estimate the impress that these countless generations of license have left upon the present generation. To stem the tide seems well nigh impossible, but as certain of our more delicate or showy plants seem on the verge of extinction, as the result of thoughtless, not to say wanton, destruction, it would seem that the time had come when steps must be taken before they are numbered with the relics of the past. The problem is how this end may be accomplished.

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*Awarded the first prize of fifty dollars, competition of 1902, from the Caroline and Olivia Phelps Stokes Fund for the Preservation of Native Plants. Reprinted from the Journal of the New York Botanical Garden, Vol. III, No. 27. 1902.

As already suggested, it is practically only those plants and animals that enjoy a real or fancied economic importance that have been the objects of protective enactment, and even in this respect laws for the protection of plants have lagged far behind those safeguarding animals. More or less rigid laws have been in force in England for several centuries, having as their object the protection of the so-called game mammals and game birds. When America was first settled by European races, game of all kinds was found so abundant that its supply seemed inexhaustible, and it is only within the past two or three decades that the public conscience has been awakened to the danger of its total extermination, and as a result of this awakening every state and territory in this country now has, for the most part, a carefully drawn game law, and within the past year we have had the first effective national legislation — the so-called Lacey act — which makes the transportation of game of all kinds, or birds used for decorative purposes, from one state to another a crime against the United States.

Parallel with this, in large measure, is the case of our forests. This country is so vast and the forest area was so enormous that the supply seemed illimitable. But wise heads long ago foresaw the parallel between this country and the various European states regarding forest denudation and sought to stay the tide of destruction. But it was only when the actual end was in sight that remedial measures were seriously thought of, and as a result forestry has gained more ground within the past ten years than during all the world's history. As proof of this quickening interest it may be stated that the U. S. Department of Agriculture, through its bureau of forestry, which in 1898 offered to take charge of and administer private forest lands along the lines of scientific forestry, now has actually under its management 176,975 acres, and has on file applications from private owners covering over four million acres. Add to this the fact that the U. S. Government has set aside

41 forest reserves in various parts of the country, having a total area of 46,827,969 acres, and we can appreciate how forest protection has grown.

We may return for a moment to the consideration of the birds that are not ranked as game birds, for they furnish the closest parallel with our plants. As they are practically valueless for food, they were not at first included under protecting laws. They were common property to be destroyed at will. Under the caprice of fashion millions were destroyed annually simply for decorative purposes. Owing to this ceaseless persecution not a few species were threatened with absolute extinction, and only then did the sentiment for their protection begin to gain ground. At first confined to a few nature-lovers, the agitation has spread until, within the past ten years, we have seen a veritable wave of sentiment for bird-protection extend from end to end of this country. Dozens of societies for the study and protection of birds have been organized, magazines of similar scope have been established, numerous books have been written, and finally legislation has been enacted, making it a crime against the state or the nation to traffic in our song or insectivorous birds. As the result, the birds of the seashore, plain and forest are to be spared to us.

I have ventured to indulge in this somewhat lengthy preamble for the purpose of showing, on the one hand, the difficulties that naturally inhere in the problem before us, and, on the other hand, to set forth the measure of encouragement afforded by kindred undertakings. To devise means for the adequate protection of our native plants will not be easy; but the same might have been said a few years ago about our birds, yet their protection by legislative enactment and an awakened public sentiment is an accomplished fact. It is but reasonable to suppose that the same may in time be accomplished for our vanishing plants.

It seems to me that all legitimate effort that can be made for the conservation of the native flora is naturally divisible into two fields — first, the broader, higher plane of enlightened public sentiment regarding the protection of plants in general, and, second, the immediate steps that must be taken to save certain of the more showy or interesting forms now threatened with extermination. The first is something we may reasonably hope for, even if it comes slowly; the second is a practical question that must be solved quickly or it will be too late.

It has been pretty conclusively shown above that as the plants most in need of the safeguarding are without a definite money value, it can only or largely be accomplished by an appeal to sentiment. As forests possess this economic value, their conservation may safely be left in the hands of interested parties. Under the guidance of this growing band of expert foresters the future is reasonably assured. The public must be educated up to the point where it will be possible for them to enjoy the flowers and plants of field and forest without destroying them. They must be led to see that it is only selfishness which prompts the indiscriminate plucking of every bright-colored flower or shapely fern that attracts their eye. A walk afield, enlivened by the presence of flowers and birds, leaves behind a memory that may be cherished for years. The ruthless breaking up of this rounded symmetry of nature, simply for the gratification of the moment, leaves a void impossible to fill.

As a means of awakening this more or less dormant public sentiment, I would make the following suggestions:

In large measure it can be accomplished by the aid of the public press. As perhaps the best means of reaching this field, I would advocate the formation of what may be called a *press bureau.* That is, an individual or a set of individuals should be charged with the duty of preparing, from time to time, short, crisp, readable accounts of this movement. These should be printed on slips in the form of "copy" and distributed as widely as possible to newspapers and other periodicals, accompanied with a request to the editor for publication if found available. Some will, of course, find their way into the waste basket, but if supplied in this convenient form, many will undoubtedly be printed. This work should not be sporadic, nor, on the other hand, would it be wise to crowd it.

As a further means of spreading this movement I would advocate the establishment of a national society, aiming to do for plants what the Audubon Society has so well done for our birds. This, of course, should be in no wise a technical botanical society, but an organization adapted especially to children, young people and nature-lovers in general. With relatively slight modification the constitution of the Audubon Society could be adapted to the needs of an organization of this kind, for which I venture to suggest the name *Torrey Society.* There could be no more fitting memorial to this celebrated botanist than a society devoted to the preservation and popular study of the plants he loved so well.

The establishment of chapters of this society should be urged in centers where interest, however slight, is manifested, and in time a journal devoted to its needs could be inaugurated. At first, however, it might be best to affiliate with some existing publication, after the manner of the magazine *Bird-Lore,* which is the official organ of the Audubon Societies.

Another fruitful field to be cultivated is the public school. Probably no class in the general public is so destructive of flowers and plants as the average school child. Most children are naturally destructive, but most of this comes from thoughtlessness which can be in large measure corrected by judicious instruction. As a first step toward securing this correction the aid of teachers of nature classes should be secured. Leaflets setting forth the objects of this movement should be widely and systematically distributed among teachers, and if practicable a reading book adapted to the lower grades of public schools should be prepared, in which interesting accounts of plants and plant-life should be woven with appeals for plant protection.

The establishment of school gardens should be heartily encouraged, for the abundant success attained by these gardens, both abroad and in this country, shows beyond question that children are easily interested in watching the processes of plant growth, and when once their interest is aroused half the battle for plant protection is won, at least so far as they are concerned.

We may now turn our attention to ways and means calculated to produce immediate results. "Immediate" is the only word that can be used here, for in certain localities, such as the proximity to large centers of population, watering places, summer resorts, etc., many plants are approaching dangerously near the point of being destroyed absolutely.

As a first step toward this end, it seems to me that the public should be informed, once and for all, that none of these plants that it is desirable to protect has any definite intrinsic value. They should be made to understand that the plants are simply a part of the definite setting of nature that it is important for esthetic or scientific reasons to maintain. The cupidity of the average human being is so great, that, if it were simply rumored that these plants could command a money price, their doom would be fixed.

Whenever it is possible, signs should be erected containing warnings against the plucking of flowers or fruits or bright-colored leaves from shrubs and trees. Most residents of cities are already familiar with rules against mutilating plants in parks and along public streets, and similar warnings, if posted conspicuously in the more rural locations, will undoubtedly have a salutary effect. There should be no disposition to exclude the public from the enjoyment of the beauties of nature, so long as the rights of others are recognized. I have in mind a very large landed estate, which the public is invited to enjoy, the only condition being that the plants and animals must not be disturbed.

Whenever certain species of plants are becoming rare on account of devastations by man, signs should be posted along conspicuous routes requesting moderation in gathering, or even abstinence, on the part of the public. These should not be worded so as to direct the public to the exact spots where the plants may be found, but rather of a general nature, calculated simply to call attention to the fact of their rarity.

As many persons may not recognize a plant by its common or scientific name, it might be well to post in a conspicuous place a colored drawing of it, or in the absence of this a dried specimen (suitably protected by glass) and requesting that if the plant is found in the vicinity that it be not disturbed. Teachers of nature classes could be of great assistance in bringing rare plants to the attention of their pupils in this manner. In public lectures forming parts of nature courses, speakers should be urged, when possible, to inform their audiences of this movement, and request their coöperation.

In this connection I can but urge again the formation of local societies for plant protection, perhaps under the guidance of a central or national organization, which could supply them with leaflets for distribution and otherwise direct their energies into the most fruitful channels.

And finally, after having dealt with the so-called "general public," it may not be amiss to say a word to the botanist. It has not usually been thought necessary to protect plants from botanists, for of all people they should be interested in the protection of our flora. No true botanist will in any way endanger the perpetuation of a rare or interesting plant, nor will he knowingly become a party to such a crime. It would be small encouragement indeed to the public for the botanist to preach moderation to them and be known to indulge in unlimited or indiscriminate personal accumulation.

U. S. National Museum, Washington, D. C.

AMONG FLORIDA FERNS.

By A. H. Curtiss.

IN the years when D. C. Eaton led in the study of American ferns there were a large number of botanists and dabblers in botany who were so infatuated with that particular order of plants that a noted writer of that period termed them "pteridomaniacs." I was that sort of a maniac for about twenty years, but afterwards came to wonder at such exaggerated regard for plants so simple and unvarying in general structure. Since losing my special interest in ferns I have lost the run of matters pteridological to such an extent that I do not know whether "pteridomaniacs" are more or less numerous than formerly. But I take it to be a matter of course that fern-lovers will always be numerous, and for that reason have often thought that some notes regarding my rather intimate knowledge of Florida ferns would interest many. The loss of my herbarium with its suites of specimens of nearly every Florida fern, the pick of thousands, together with the fact that I have not been among the South Florida ferns in a good many years, prevents me now from giving certain exact details which might be of greatest interest to botanists; therefore, in the following notes I shall confine myself mainly to reminiscences of my fern gathering in the peninsular state.

In Maxon's list of American ferns found north of Mexico Florida is credited with 54 species and varieties and California with 58. My finding of *Cheilanthes Alabamensis* Kunze in northwestern Florida last summer adds one to the Florida list, but I dare say some one has offset this gain in the great Pacific state. I believe there is no rivalry as to ferns except between California and Florida. Sixteen years ago, at the Cotton Centennial Exposition, Mr. Lemmon and I had exhibits of the ferns of our respective states on opposite sides of the main building. I forget what they numbered, but Mr. Lemmon admitted that Florida was one ahead. California has an immense advantage over Florida in her much greater area, range of latitude and diversity of surface. So far as the influence of altitude on the flora of Florida is concerned the state might as well be one vast plain.

Except as to a small fraction of its area, Florida consists of level or slightly undulating pine barrens, and, although these vary so greatly in one way and another as to afford a large flora, there are almost no ferns, a fact readily accounted for by the sandy nature of the soil and the scant shade afforded by the tall, small-topped pines. Where the land is naturally dry a variety of *Pteris aquilina* L. abounds; in damp lands *Woodwardia Virginica* is frequently met with, and far to the south a depauperate *Blechnum serrulatum.* (I use the old familiar names under which my collections have been distributed, and which no one will fail to recognize.) In swampy spots *Woodwardia angustifolia* is usually to be found, as well as several very common northern ferns.

The *Pteris* of the pine barrens (No. 5088 of my second distribution) and my No. 3705 * from Cape Sable were a standing source of perplexity to me until quite recently. Following the dicta of specialists, both were distributed as *Pteris aquilina caudata;* yet the two are very different, the *Pteris* of the pine barrens having the habit of growth of the northern *P. aquilina,* while that of the southern coast grows erect and tall — 13 feet high in one locality, according to report — the primary divisions spreading in different directions. A suggestion from Maxon's List, followed by correspondence with Prof. Underwood, enables me now to set the matter right. The Cape Sable fern was correctly labeled, and is confined, in the United States, to southern Florida. The fern of the pine barrens (No. 5088) extends to New York and Texas, and has been named by Clute *Pteridium* (*Pteris*) *aquilinum pseudocaudatum.* As this variety extends so far north, I presume it has found its way into nearly all herbaria under the name of *Pteris aquilina caudata* Hook.

There are two leading varieties of pine barrens: first, the "flatwoods," with numerous slight depressions, which are ponds in wet weather and are usually grown up with cypress and gum; second, the rolling barrens drained by small streams, which are bordered by almost impenetrable thickets and strips of swamp. It is in the wet, shady depths of these jungles that the handsomest of north Florida ferns, *Aspidium Floridanum*, finds its hiding place. Being a sub-evergreen it may be potted any time in the winter and made an ornamental house plant, but there are very few who see it, for the reason that its haunts are almost inaccessible and abound in venomous snakes and red bugs. The latter is a minute red insect, similar in structure to a spider, which infests woods and swamps in the south. Red bugs get brushed off on to one's clothes from bushes and herbage, and climb up one's shoes from beds of dead leaves. They crawl through the stockings to the ankles and there or higher up, wherever there is a tender surface, they burrow into the skin. Small red spots indicate where they are and become centers of irritation, especially at night. Fortunately they are easily killed or stupefied by rubbing into the skin kerosene, grease, wet salt or a thin lather of soap. Of all plants besides poisonous ones, I most dread to collect *Aspidium Floridanum*, because of the great abundance of red bugs wherever it grows. Once after making a collection of it I estimated that one surface which I could cover with my two hands contained 500 of these insects, each with eight legs and two mandibles pawing and clawing among the cutaneous nerves!

Another fern that is disagreeably associated in my mind with the red bug is *Cheilanthes microphylla*. The night after my discovery and collection of it on the Sister Islands, I camped out close to it station. With my shoes off I went to sleep on a blanket spread over some cedar boughs. After a while I awoke with a senation as if blisters of Spanish flies were on the soles of my feet. All the rest of the night I suffered this torture without suspecting the cause, never having known red bugs to go below the ankles or to cause such a burning pain.

My most interesting day's experience with ferns ended almost as disagreeably as the day of my finding the *Cheilanthes*. It was early in April, 1881. On the morning of the day before, at Gainesville, I had dropped a $20 gold piece into a liveryman's hand for a four day's ride in a wagon with two horses and a negro driver. Driving southward we crossed the Withlacoochee river by ferry and at night camped in the woods. Near noon of the second day, we came to a dense forest with wild orange trees on its border. On entering the forest it seemed as if I had suddenly entered another world, so different was it from anything I had seen in this state of terribly monotonous and tame scenery. My attention was first attracted to two skulls of cattle sticking in the narrow mouth of a chasm. The animals had evidently slipped in from an overhanging bank and been held by the horns till their bodies dropped off. Advancing into the dark forest I found the surface to be rugged beyond anything I ever saw in mountain regions, being a succession of cliffs, pits, chasms and rocks of all sizes and forms, the whole being covered with spongy mold. And there was such a wonderful variety and profusion of beautiful West Indian ferns that after my first sensation of delight, I felt appalled at the idea of collecting so many sets, and I was then making 125 specimens of a kind. But having already secured most of the species elsewhere, the task proved lighter than it at first seemed. What gave me most trouble, as well as pleasure, was the splendid *Aspidium trifoliatum,* then for the first time found in the United States.

Returning to the wagon with my large collection of ferns in boxes we rode till dark, when we came to a small deserted house by the roadside and there concluded to stay over night. I at once went to work to put my ferns in press and soon discovered that the house was full of fleas and decided that there would be no sleep for me that night and that the best plan was to sit up and work all night. That I did, and by the time breakfast was ready all of the specimens were nicely arranged in press.

Any fern lover who finds himself in Florida should make it a point to visit the station of *Aspidium trifoliatum,* for he will find more choice ferns there than he might come across during weeks of travel. It is situated on the Waycross, High Springs & Lakeland line of the Plant System of railways, between the stations named Floral City and Istachatta. I stopped at the latter place a few years ago and found a fine lot of *Ceratopteris* a short distance northwest of the station house in a pond situated in a low hammock bordering the river. There were also a great many young plants of *Ceratopteris* lodged along the river shores.

The fern hammock, as I call it (the wood hammock being a southern substitute for forest, erroneously compounded with hummock by lexicographers), I reached by riding about two miles northward and then walking about one mile through fields. The ferns most abundant are *Asplenium myriophyllum, A. firmum* and *A. parvulum, Pteris cretica, Adiantum tenerum, Aspidium patens* and *A. trifoliatum.* On my first visit, when I struck another part of the hammock, I collected *Polypodium pectinatum,* and on my last I found *Phegopteris reptans* (a "walking leaf") in one spot. I never went far into the hammock, being prevented either by lack of time or bad weather. It would be imprudent to explore this hammock alone. The last day I was there a slender sapling was all that saved me from falling backward from a ledge of rock over a sharp rock below. A day or two later a prominent citizen while hunting in the same hammock had his back broken and died after thirty-six hours of intense suffering. He was found by a mail carrier who heard his stentorian cries at a distance of a mile and a half.

Of the exquisite *Asplenium myriophyllum* there are two marked forms in this locality, and I have given both of them wide distribution, It seems that they differ only in size, but there is no apparent reason why one grows so much larger than the other. On the under side of a huge rock supported by other rocks over shallow water I observed the small form and *Asplenium parvulum* growing in abundance and with every frond pointing straight downward. It seemed odd that they were so well suited with such an unnatural situation.

Vittaria lineata is a fern which normally grows straight downward. but this is evidently the result of its extreme slenderness. It grows on trees, especially in the old leaf axils or "boots" of palmettos, and resembles tufts of some weak grass, but the mature fronds are thicker and darker than any grass. Wherever *Vittaria* grows one may expect to find the large and showy *Polypodium aureum,* which is one of the most striking objects to be seen in palmetto hammocks. Residents call it "rabbit's foot fern," on account of its pretty root-stocks, which look not unlike the soft feet of some yellow-furred animal.

Two other epiphytic ferns which I discovered on Old Rhodes Key and the eastern end of Key Largo are *Taenitis lanceolata* and *Polypodium Swartzii.* The latter reminds one of a vine, the root-stocks winding around the stems of bushes and saplings and sending out small lanceolate fronds at frequent intervals. *Ophioglossum palmatum* is also epiphytic. *Nephrolepis exaltata* grows not only on trees, but equally well on the ground. Sometimes it gives a most beautiful appearance to palmettos, its long, drooping fronds forming an elegant circle of leafage just below that which belongs to the tree. Though preferring shade, I have seen this fern growing in great abundance in clearings fully exposed to the sun. It is a most troublesome fern to press, not only on account of the elasticity of the stipes and long, wiry roots, but because the pinnae drop off unless rapidly dried. Two other intractable ferns are *Polypodium pectinatum* and *P. plumula.* The stipes of the latter, after having lain flat for many years, instantly resume their natural curvature on the removal of pressure.

There are three ferns of which satisfactory specimens cannot be made because of their great size. These are *Pteris aquilina caudata, Acrostichum aureum* and *Aspidium unitum glabrum.* The latter grows small enough in some localities, but where it grows eight feet high and eighteen inches wide the best specimen that can be made consists of the end of a frond and a few of the lower pinnae. As to the *Acrostichum,* the best that can be done is to provide a pair of sterile pinnae and an end or section of a fertile frond. The under surface is entirely covered with golden-russet spores, and to such a depth as to render them quite heavy; and it is often difficult to find presentable specimens of them on account of the habit which certain insects have of burrowing among the spores. This plant differs as much from the popular ideal of ferns as does the floating *Ceratopteris* or a mossy *Hymenophyllum*. Even a student of ferns could hardly appreciate how stout and coarse it is without seeing it in its native swamps.

My first addition to the list of Florida ferns was *Cheilanthes microphylla*. That was about twenty-five years ago, and it was considered a remarkable find, as that fern had never before been found in the United States except on the border of Mexico. A few years ago I revisited the original station, and the only one known to me, and found not a vestige of the *Cheilanthes*. It grew on one of three immense Indian shell mounds, which rise out of the marshes near the mouth of the St. John's River and which are known as the Sister Islands. Numerous subtropical plants used to flourish on the same mound, but nearly all of them were killed when the orange groves were frozen. I believe some one found the same fern on the opposite side of the river, on St. John's bluff. This is now occupied largely by fortifications.

Cheilanthes Alabamensis I found last summer a few miles south of Chipley, which is about forty miles west of Chattahoochee. I had been having a tedious ride when I came across this fern, but feeling doubtful of its identity and pressed for time, I merely secured enough for study. This was a mistake, which caused me much time and trouble. The next morning I had the liveryman send me back to Cedar Grove, as the locality is called, but with a different driver we failed to find the fern. The liveryman generously assumed responsibility for the failure and promised to send me again in the afternoon with my first driver. But he could not be found until near sunset, and when at last we reached the right spot there was little of daylight left. But with bright moonlight sifting through the treetops and by careful searching on top of a tower-like rock I think I succeeded in securing all the good plants, leaving, however, plenty of roots for future growth. The fronds grow larger here than in Alabama, attaining a maximum length of 18 inches.

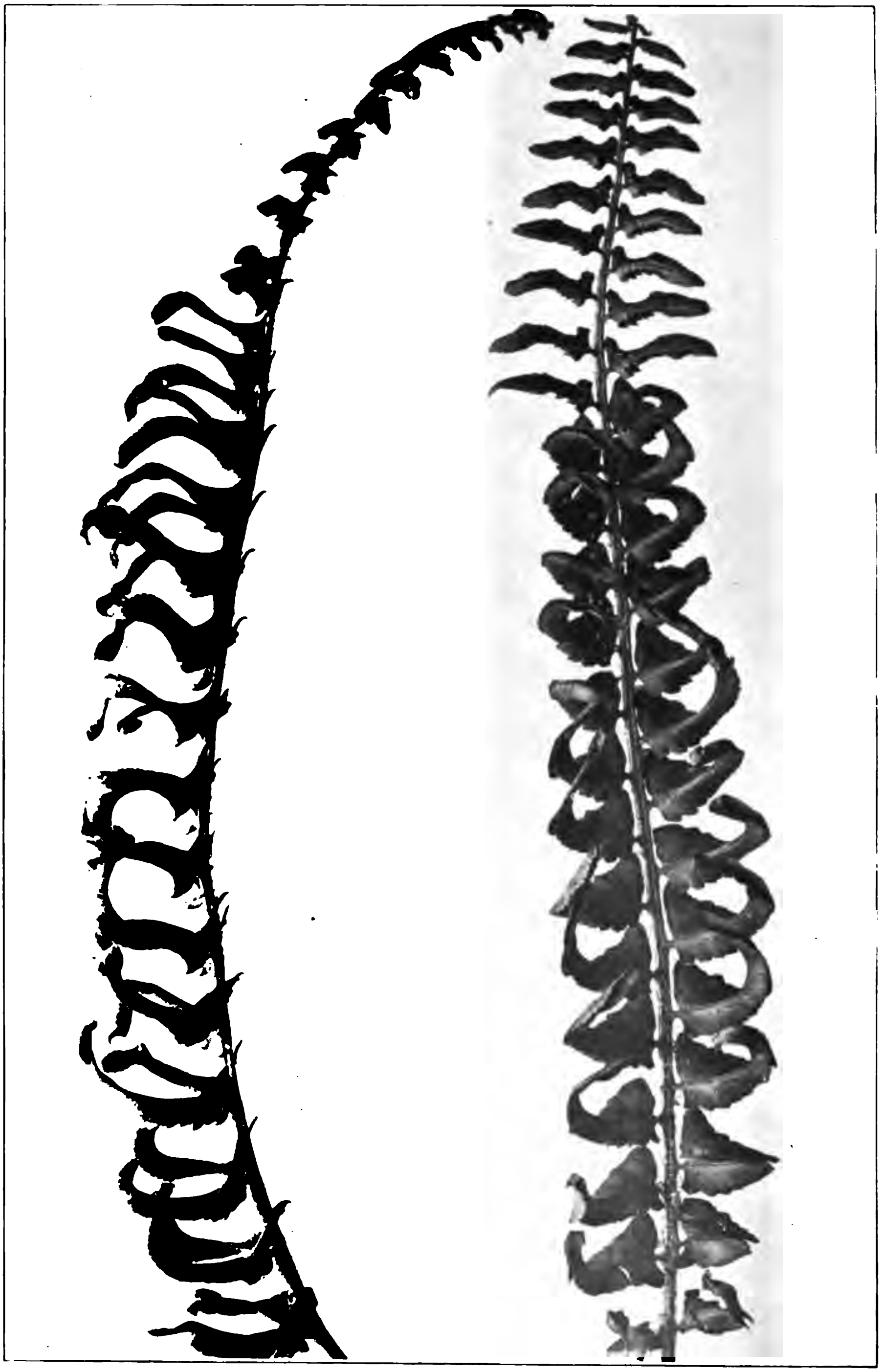
Pteris longifolia and *Aneimia adiantifolia* are ferns which I have found only on the old coral rock of extreme southern Florida, on the southeast shore of the mainland and on that peculiar group of keys composed of Big Pine, Little Pine and No-name Keys. The locality where I have collected *Aneimia* principally is a peculiar one, extending south from Cutler on Biscayne Bay. The coral is less rugged here than usual, but it is full of pits and perpendicular holes whose origin is hard to account for. Some of the holes are no larger than stove pipes, and, being more or less hidden by herbage, they are somewhat dangerous.

I have a distinct remembrance of stepping into one of these holes and coming down on one knee with force enough to break it, it seemed to me. The *Aneimia* develops best when growing around the mouths of these openings. But neither it nor the *Pteris* want shade, only a little protection from high winds. Tourists sometimes report finding an *Adiantum* in this region. It is this *Aneimia*, whose sterile fronds somewhat resemble *Adiantum Capillus-Veneris*, though much thicker.

Two other ferns which become associated in the mind are *Asplenium serratum* and *Polypodium phyllitidis*. They both grow on the ground in hammocks, the clustered thick fronds being about two feet long, narrow and undivided. Almost any one but a botanist would take them to be one and the same species. The *Asplenium* is the handsomer of the two, but it is very rare. The *Polypodium* is frequently met with as far north as Cape Canaveral. Those who have my last specimens of this fern may be interested in an amusing incident that followed this collection. I was traveling in a sail boat on one of the lagoons which make up the so-called Indian River and had stopped at Sewell's Point to explore a neighboring hammock. Returning with a big bunch of the *Polypodium* clasped in one hand I found my boat lying outside of a small row boat. I carelessly stepped into the latter with the intention of swinging myself across to the sail boat, but in doing so gave the little boat a momentum exceeding my own and in an instant found myself hanging to it by the heels, with my head near the bottom of the river. My boatman, hearing the splash, rushed to my assistance, and, seeing my feet, readily judged where the rest of me was to be found and pulled me out. My hat had to be fished in, but I did not let go the ferns till I was in my own boat. I had to sit in water-soaked clothes for an hour, but had the consolation of having dry feet. The only damage sustained was the stoppage of my watch and a $5 job on it later. The only danger escaped was a stunning blow on the head in my fall backward toward the wharf steps, which I may have missed by a hair's breath.

I will now conclude these desultory notes with a story of the floating fern, *Ceratopteris thalictroides*, which seems to me the most interesting of all ferns. In October, 1879, after a five months' cruise on the East Coast lagoons, I arrived at Titusville, where there is a portage of seven miles to the headwaters of St. Johns. In June, I had deposited my first month's collections with an acquaintance of that place, and in August had sent twice as many more of my bundles to his care. I expected to find all stored in a dry and safe place. What my astonishment to find that they had all been deposited in a frail boat house at the end of a wharf! And I was warned that with the high water and violent weather then prevailing the house was likely to be washed away any day.

[Continued in Next Issue.]



A Singular Frond of the Christmas Fern.

BRIEFER ARTICLES.

A SINGULAR FORM OF THE CHRISTMAS FERN.

The accompanying plate shows two curiously transformed fronds of the common Christmas fern, *Polystichum acrostichoides* (Michx.) Schott, collected on May 25th, 1901, in the picturesque vicinity of Glen Carlyn, which is not far from Falls Church, Virginia. Both fronds are ordinarily fertile at their apices, and these portions alone, it will be observed, lie in the normal plane. The sterile pinnae have assumed a semi-circular form in a plane perpendicular to the fertile portion; each is curved upward into a semicircle and folded lengthwise upon itself, the midvein forming the keel or boundary of the inner curve. The views here presented of the two fronds supplement each other admirably; but after all, the print fails to convey an adequate impression of the extreme oddity of the fresh specimens. Except for the flat fertile tips the fronds were like latticed green tubes.

The fronds were collected hastily near a path in a rich woodland by an acquaintance while "a-birding," and no particular notice was taken of the surroundings or of the plant itself; consequently a later search did not avail in locating the plant, and we do not know whether the other fronds were of this sort. It would have been of the greatest interest to develop the form under cultivation, and it is scarcely to be doubted that so well-marked a type of variation could have been made permanent and very likely could have been multiplied successfully. I shall make a further search for the plant, during the present spring. The plate herewith presented is from a photograph by Mr. Henry E. Baum, and shows the plant at its natural size.—WILLIAM R. MAXON, *Washington, D. C.*

THE SEQUOIA FORESTS.

The part of the Twenty-first Annual Report of the U. S. Geological Survey devoted to Forest Reserves, by Mr. Henry Gannett, Geographer, now in press, but not yet published, contains the reports on the Yosemite and Sonora quadrangles, by Mr. C. H. Fitch, and on the Markleeville, Pyramid Peak, Placerville, Dardanelles, Big Trees, and Jackson quadrangles, by Mr. Geo. B. Sudworth. The total area included in the examination, over 7600 square miles, is a famous part of California. It runs from the San Joaquin Valley on the west, eastward across the Sierra Nevada into the deserts of Nevada, forming a complete section of the great range of California, and including a part of the great gold belt or Mother Lode, groves of big *Sequoia* trees, the Yosemite National Park, and nearly the entire areas of the Stanislaus and Lake Tahoe Forest Reserves. The counties of Eldorado, Alpine, Amador, Calaveras, Stanislaus, Tuolume, and Mariposa are included, in whole or in part. The area slopes in a long swell from 500 feet above sea level at the western edge to nearly 14,000 feet near its eastern edge. Up to about 3000 feet the country is covered with chaparral, with scattered oaks and digger pines. At 3000 feet yellow and sugar pines appear, and the forest continues to over 8000 feet, forming a belt 40 to 50 miles wide on the slope of the range.

The timber of commercial value grows best between the altitudes of 4500 and 6500 feet. The principal timber trees are yellow pine, sugar pine, and red fir. In some areas the stand of timber will run from 80,000 to 140,000 feet, B. M., per acre; the usual range is from 5000 to 50,000 feet per acre.

This forest is open, with little underbrush. Three groves of big *Seqouia* are in the Yosemite quadrangle, the Merced, the Tuolume, and the Mariposa. *Sequoias* of all ages are to be found in the Mariposa grove, many of them thrifty trees measuring from one to thirty feet in diameter and 300 feet high. Mr. Fitch thinks that, with continued and proper protection against fire, the *Sequoias* may be able to perpetuate themselves; but that reproduction is not going on to any extent, and fires are not wholly guarded against. The famous Yosemite Park is illustrated in the nine plates attached to this report. The total stand of timber on these two quadrangles is eleven billion feet.

With regard to the *Sequoias*, Dr. Sudworth states that they grow on the west side of the Sierra at from 4600 to 8400 feet above sea level. Eleven isolated groves are found, which extend about 260 miles southward from the southern border of Placer County. Two of these groves, the Calaveras and the Stanislaus or "South Calaveras," are included in the territory under consideration. The trunk of the big tree has an enormous swell at the ground. This swell is from 2 to 8 feet greater than the diameter at 6 feet from the ground. The length of clear stem varies from 100 to 180 feet. The trees in the Calaveras grove range from 9 to 19.5 feet in diameter 6 feet above the ground, and from 235 to 325 feet in height. There is no reproduction of the big trees in the Calaveras grove, and reproduction is found at only two points in the Stanislaus forest where fallen timber has protected them. The seedlings are from 2 inches to 4 feet high, and the saplings are from 10 to 30 feet high.

The stump of a Calaveras tree, cut down in 1853, measured 27 feet inside the bark, and the age of the tree is estimated as about 1300 years. Mr. John Muir states that a tree of similar diameter cut down in Kings River grove was 2200 years old. He mentions another tree of the same grove as being 4000 years old, and probably over, as all the rings could not be clearly counted. Probably none of the Calaveras or Stanislaus grove trees are older than this, and most likely the majority are under 2500 years.

Thirty plates illustrate the classification of the lands, the trees, lakes, canyons, etc., of the region. The scattered information concerning the rate of the growth of forest trees has also been collected in tabular form and discussed by Mr. Gannett.

AN INTERESTING AROID.

Philodendron fenestratum or *Monstera deliciosa*—rarely does a plant rejoice in two such well-merited names. This tall Mexican member of the Araceae has immense dark green, glossy, leatherlike leaves, two feet long and almost as wide, terminating a stem even longer. These leaves are ornamented with numbers of clean cut holes, so large that they can easily be used as windows, as the name suggests. The question naturally arises, is there a purpose in these openings, or are they the result of an accident? So far as we can learn, they are simply one of the innumerable ways in which Nature adorns her handiwork.

The yellowish white spathe and the ten-inch long spadix at once betrays the kinship with the *Calla* and other Aroids. The fruit looks like a long green pine cone, the rind being composed of hexagonal plates. As the fruit ripens, it takes on a slightly yellow tinge, and the outer rind falls off at a touch. It is said to taste like a mixture of pineapple and banana, and is unanimously voted delicious. The name *Monstera* is given because of the long aerial roots emitted by the stem, many of which never reach the ground, but suggest the fingers of some fabulous monster. This grotesque dragon-like aspect is very pronounced in a notable specimen in Philadelphia, which has climbed into an upper gallery of the highest house in Horticultural Hall, Fairmount Park. Quite a number of these plants can be seen in the Central Park greenhouses. A monkey climbing up on one of them presents the idea that from them the natives were taught to appreciate the lusciousness of the fruit. Although it naturally grows by attaching itself to trees and climbing up, it appears to be more fruitful if forced to grow on the ground without climbing.—PAULINE KAUFMAN, *New York City.*

THE WILD FLOWER PRESERVATION SOCIETY OF AMERICA.

An organization, under the above title, of persons interested in the subject of the protection of native plants was duly effected in New York city, on April 23, 1902. Details of organization were entrusted to a committee consisting of Dr. N. L. Britton, Dr. D. T. MacDougal, Prof. L. M. Underwood, Dr. Arthur Hollick and Mr. Charles Louis Pollard, which committee met, drafted a series of by-laws and made nominations of officers, all its recommendations being adopted by the society at an adjourned meeting held the following day. It was also voted that THE PLANT WORLD should be designated as the official organ of the society, and that the secretary should be empowered to arrange for a public lecture in Washington, on some topic in line with the aims and objects of the society.

In accordance with the above recommendation, a lecture will be given May 22, 1902, in the lecture hall of the U. S. National Museum, by Dr. N. L. Britton, on the subject, "Some Wild Flowers in Need of Preservation," illustrated by colored lantern slides. This lecture will be open to the public, and all persons enrolling as members on or before that date will be treated as charter members.

The annual dues are one dollar for members; for fellows, twenty-five dollars; for patrons, fifty dollars, fellows and patrons being exempt from the payment of further dues. THE PLANT WORLD is sent free to members of all classes. Dues may be sent either to the treasurer or the secretary.

The officers for 1902 are as follows: President, Frederick V. Coville, Washington City; vice-president, D. T. MacDougal, New York City; secretary, Charles Louis Pollard, 1854 Fifth street, Washington, D. C.; treasurer, Mrs. Carolyn W. Harris, 125 St. Marks avenue, Brooklyn, New York; managers, Mrs. N. L. Britton, New York City; Miss Alice Eastwood, San Francisco; L. H. Bailey, Ithaca; E. L. Morris, Washington; C. F. Millspaugh, Chicago, Ill.; C. D. Beadle, Biltmore, N. C.; Joseph Crawford, Philadelphia, Pa.; Charles E. Bessey, Lincoln, Neb.; Walter Deane, Cambridge, Mass.; William Trelease, St. Louis, Mo., and F. H. Knowlton, Washington City.

The by-laws and additional details concerning the society will be published in THE PLANT WORLD for May.

CHARLES LOUIS POLLARD, *Secretary.*

NOTES OF CURRENT LITERATURE.

THE DECAY OF TIMBER AND METHODS OF PREVENTING IT is the title of a valuable contribution by Dr. H. von Schrenk. [Bureau Plant Industry, Bull. 14.] It begins with the structure of timber, giving account of the elements composing wood of heart and sap, and then proceeds to the consideration of the factors which cause decay in wood. The major portion of the paper is devoted to timber preservation, and must prove of great value to railway companies and others interested in this subject. The maintenance of the supply of cross-ties is a problem of serious moment, not only to the railway manager but to the forester as well. The book is illustrated throughout.

THE Department of Agriculture has recently published a list of the economic and other fungi of which they now have specimens for distribution. They will go in the main to experiment stations, but may also be obtained by private workers to whom they will prove of value.

"THE COW PEA" is the title of the latest publication issued by the Experiment Farm of the North Carolina State Horticultural Society at Southern Pines, N. C. This book, neatly bound and illustrated in plain and concise manner, discusses the value and uses of this important crop, the Cow Pea. Every reader can get a copy free by writing to the Superintendent of Experiment Farm, Southern Pines, N. C.

THE announcement of the fifteenth annual session of the Marine Biological Laboratory at Wood's Holl, Massachusetts, has been received. The session will extend from July 2 to August 13, and in botany three courses are offered: (1) Cryptogramic Botany; (2) Ecology; (3) Plant Physiology. The botanical staff consists of B. M. Davis, George T. Moore, R. H. True, Henry C. Cowles, Charles H. Shaw and others.

AMONG the many plant catalogues that have come to our attention, perhaps, none is more attractive than that issued by Harlan P. Kelsey, of the Highlands Nursery, Kawana, North Carolina. Only hardy American plants are offered, and it is perhaps surprising to some to know how attractive many of our native plants are in cultivation. They should be more extensively grown.

EDITORIAL.

Elsewhere in this issue we print the prize essay by Dr. F. H. Knowlton, to which reference was made in the last number of THE PLANT WORLD, and which has already been published in the Journal of the New York Botanical Garden. The letters of appreciation received from all parts of the country and the many requests for reprints indicate that there is a widespread popular interest in the subject of plant protection, a fact of which we have always felt confident. It is, therefore, a matter of pleasure as well as pride to us that the suggestions made in this essay have borne fruit, and that an organization, to be known as The Wild Flower Preservation Society of America, has been founded, with the object of appealing to public sentiment through lectures, the distribution of leaflets and other means, in order to secure the preservation of our rarer native plants from destruction. We have had occasion in these columns to refer to the work of the New England Society for the Protection of Native Plants in terms of high commendation; but a society purely local in its scope cannot hope to accomplish all that might be done by a larger working body of national renown. So also an official organ for the publication of reports, notices and other matter is an absolute necessity in carrying on a labor of this kind, as the experience of the Audubon Society has amply demonstrated. In recognition of this, the charter members of the new society, after electing officers and managers representing all sections of the country, and adopting by-laws somewhat similar to those of the Audubon Society, designated THE PLANT WORLD as the official organ, and an agreement between the society and and the Plant World Company is now in course of preparation, whereby this journal, in consideration of a certain percentage of the annual dues, which are fixed at one dollar, will be sent without further charge to all members, and will print in its columns all chapter reports, official notices, etc., and frequent essays on the subject of plant preservation which will be afterward issued as reprints and widely distributed by the society.

The first formal public launching of the Wild Flower Preservation Society will be through the medium of a public lecture, in Washington city, May 22d, by Dr. N. L. Britton, of the New York Botanical Garden, on the subject, "Some Wild Flowers in Need of Preservation." The lecture will be illustrated by colored lantern slides painted from life. It has been decided by the board of managers that all persons joining the society on or before this date shall be enrolled as charter members. We cannot urge too strongly upon our readers the importance of helping on this work, which requires, at the very outset, a considerable outlay before much can be accomplished in the way of bringing to public notice the aims and objects for which the society strives. The treasurer is now prepared to receive membership dues or other contributions, and we invite attention to the official notice in another column, in which will be found full particulars as to dues and officers.

BOOK REVIEWS.

PRIZE GARDENING, HOW TO DERIVE PROFIT, PLEASURE AND HEALTH FROM THE GARDEN. Compiled by G. Burnap Fisk. New York: Orange Judd Company.

This book is in many ways unique. Prizes aggregating two thousand, five hundred dollars were offered for the best garden accounts for the season of 1899. The contest was inaugurated by the *American Agriculturist* weeklies, *Orange Judd Farmer*, of Chicago, for the West; *American Agriculturist*, for the Middle and Southern States, and the *New England Homestead*, of Springfield, Mass., for the East. These prizes were offered not for the story of bigger profits or for fancy results, but, in the language of the rules, "to the records and reports which show most clearly and accurately the methods pursued, and the receipts and expenses of the garden, irrespective of whether it shows a profit or not."

About 5000 people gave notice of intention to enter this contest, and 515 actually sent in reports of the season's work. The little book before us is a condensed account of the various prize-winners in this unique contest, and is replete with interest, telling how success was achieved or failure encountered, mainly in the language of the contestant. It shows clearly what may be accomplished by determination and a willingness to work for it. Many a person of delicate health has found renewed life in this kind of out-of-door activity. The book is well worth reading not only by the home-seeker, but by the practical worker, for the many practical accounts it gives of operations in so many parts of the country. It is illustrated throughout and should find a place in every farmer's library. F. H. K.

ASPARAGUS, ITS CULTURE FOR HOME USE AND FOR MARKET. By F. M. Hexameter. New York: Orange Judd Company.

This little book appropriately begins with an account of the various species of asparagus that are now known in ornamental cultivation, but as might be inferred from the title, it is mainly devoted to the common edible species. The information concerning this is very complete, indeed, beginning with the preparation of the proper beds for planting it, the care during growth, including insect and fungus enemies, and finally the harvesting of the crop. It is well written and will undoubtedly prove of great value to all who contemplate the commercial raising of the crop. It is adequately illustrated throughout. F. H. K.

ELEMENTARY PLANT PHYSIOLOGY. By Daniel Trembly MacDougal, Ph. D., Director of the Laboratories, New York Botanical Garden. 12 mo., 138 pp., 108 illustrations. Longman, Green & Co., New York, 1902.

This book the author tells us is intended to supply the place of his "Experimental Plant Physiology" which is now out of print. The book contains seven chapters as follows: I. Introductory. II. Growth. III. Reproduction and Germination. IV. Exchange and Movement of Gases and Liquids. V. Nutrition. VI. Respiration, Digestion and Fermentation. VII. Stimulation and Correlation. The book is designed for a laboratory manual. Concise and comprehensive directions are given for carrying out experiments demonstrating the principal functions of plants. The numerous illustrations add much to the value and attractiveness of the volume. Physiological botany is at present receiving more of the attention it deserves than it ever has received before, and this volume, which should be in the hands of every teacher of the subject, should tend to increase its popularity and promote its progress. C. L. S.

THE PLANT WORLD

A MONTHLY JOURNAL OF POPULAR BOTANY

OFFICIAL ORGAN OF THE WILD FLOWER PRESERVATION SOCIETY OF AMERICA.

Vol. V. MAY, 1902. No. 5.

NEW MISSIONARY WORK.*

By Cora H. Clarke.

AGAIN we are called upon to rally to the defense, this time of our native plants. One becomes a little weary of this constant warfare, but nothing is more certain than that we are not put into this world to avoid action, since it is absolutely impossible for us to avoid responsibility, those who refuse to hear about a wrong being as accountable for the continuance of said wrong as those who, hearing, refuse to act; and they in turn are no less to blame than those who act, but act ineffectively or injudiciously.

Since we have no reason to discredit the statement that our native plants do require protection, it becomes our duty to inform ourselves as to the dangers which threaten them, to ascertain the best means of combating these dangers, and to consider how we, individually, can aid in the warfare.

The circular of the New York Botanical Garden calls for "Essays on the Preservation of Wild Plants, including shrubs, herbs and trees." We are tempted to consign schemes for the preservation of trees to the Forestry Association;† there is surely no danger of the extermination of tree-species by the gathering of tree blossoms? Possibly not, but species-extermination is not the only evil that threatens our flora — we

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*Awarded the second prize of thirty dollars, competition of 1902, from the Caroline and Olivia Phelps Stokes Fund for the Preservation of Native Plants. Reprinted from the *Journal of the New York Botanical Garden*.

†The American Forestry Association, Washington, D. C.

wish also to guard against a decrease in the number of individual plants of useful, interesting or beautiful species. In 1891 Dr. Farlow* called attention to the destruction of shade trees on country roadsides and the streets of villages, towns and cities through the gross indifference of the town and city fathers and the public generally, who allow telegraph and telephone men to mutilate the branches, the horses of the milkman or grocer to gnaw the bark, and ignorant officials to prune the trees, or even, on the slightest pretext, to cut them down. He says: "It is all very well to talk about the protection of forests and the formation of National Parks in distant states. But we have our own forests, which are the trees in our streets and public grounds, and before turning our eyes in other directions, we had better see what is needed at home. . . . Not a few of our New England towns owe their prosperity as summer resorts to the arching elms and rounded maples whose loss no money could replace, . . . an effort should be made to secure legislation which shall make compulsory the placing of guards around trees in exposed places. Furthermore, the care of trees in public grounds should be entrusted only to persons specially trained for the purpose."

Botanical friends who spend summers in the country complain of the ruthless way in which, in mending or widening the roads, the most beautiful wild growth is destroyed through being plowed up, mowed down or smothered with stones or gravel, and suggest that the missionary movement should especially aim at reaching selectmen, roadmasters or those who act, in more ways than one, as highwaymen.

The chief danger that menaces our native plants is from those who cut or dig them in quantity to sell in the cities. We rely upon the Forestry Association and the Plant Protection Society to tell us whether the evergreen trees, pines, spruces and first are in danger from the wholesale attacks they suffer in December. It pains some of us to see the cart-loads of Christmas trees brought into the city annually, to be enjoyed but for one night, and then to be cast aside. We read† of children in an English village going out to the plantation to dig up their Christmas tree, planting it carefully in a tub before they bring it into the house; after it has appeared in full glory at their evening party, they trundle it in a wheelbarrow, "all its ornaments bobbing wildly," down to a neighbor's, where it delights the eyes of a party of poor children. After this, it is taken back to its original home and planted out, to grow in peace until the next Christmas. This delightful method is hardly feasible for our large cities, but possibly it can be imitated in the country.

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* W. G. Farlow. Diseases of Trees Likely to Follow Mechanical Injuries. Read before the Massachusetts Horticultural Society, March 7, 1891.

† C. M. Yonge. Both Sides of the Shield. Macmillan.

"Trees, shrubs and herbs," the appeal reads; shrubs are perennial and picking their flowers does not kill them, but we usually have to break off the flowers with a length of branch and leaves, and this has the effect of pruning. Now, though judicious pruning benefits a plant, overpruning weakens it, and injudicious pruning, or pruning done at the wrong season, is also bad for it. It is holly and mountain laurel that our Boston Society calls upon us especially to protect, as they are both slow-growing shrubs, and the poor laurel has to undergo two attacks annually, one for the flowers in summer and one for the evergreen leaves at Christmas time. We rely upon the same society to inform us if we should refrain from purchasing pussywillow, flowering dogwood, azaleas and black-alder; the scarlet berries of the latter are very beautiful in early winter, though it lacks the leaves of its cousin, the holly. The ground pine is said to be in danger from being torn up wholesale for Christmas green, and we have already been called upon in the Boston *Transcript* to refrain from purchasing the Mayflower offered for sale in quantity in the streets in early spring.

The leaflet I have just quoted is No. 1 of our Plant Protection Society, and is written by Robert T. Jackson. The herbs which he deems in need of protection are sabbatia and fringed gentian, but he considers the following species so abundant as not to be in danger: marsh marigold, iris, aster, golden rod, violet except the crowfoot (which is that? *Viola pedata?*) and houstonia. I take exception to including the houstonia in this list, because one has to dig it up in clumps, root and all; it is nearly impossible to pick it flower by flower.

The maiden-hair fern, Mr. Jackson tells us, has been nearly eradicated in this vicinity; think what a loss this is to us all. I did not even know that it formerly grew here. But I have noticed that the evergreen native ferns are much used by Boston florists as a cheap green to add to bunches of carnations and other leafless flowers to save their hothouse smilax and diosma.

A friend in Orchard Park, N. Y., writes me that two species of evergreen ferns have been practically exterminated about Buffalo by the greenhouse men. "Where twelve years ago were luxuriant beds and rich masses of these ferns, now only a few puny specimens are to be seen. The same thing has happened to the beautiful maiden-hair fern, though it never was as abundant as other ferns." She also writes from Connecticut, "from the country about Waterbury in fact, from New Haven County, within twenty years, the once riotously abundant *Kalmia latifolia* and plentiful *Epigaea repens* have been skinned. The latter has almost disappeared, and the former grows in scrubby little plants with yellowish leaves in place of the rich dark foliage that I remember. The rose-colored wild azalea or swamp honey-suckle has become rare, and the great bird's-foot violet is very rare now in this locality, although I remember its growing in sheets of blue on the sandy hillside, thirty years ago. The same story is true of the ferns here — they are sent to the New York market. We think the Goths and Huns barbarians to destroy the art treasures of Rome, but we are more barbarous toward our beautiful native trees and plants."

The agents invoked by the Plant Protection Society to prevent this wholesale destruction are:

Legislation, such as protects the Hartford trailing fern.

Moral suasion — articles in papers and magazines, explaining the dangers which threaten our native flora, and calling upon people not to buy certain species.

Education, which goes more deeply into the subject, and endeavors to teach both children and adults, by lectures, lessons and talks, the beauty and worth of our native flora, the duty of preserving it and the best way to enjoy it. Can we not persuade those who go out to gather flowers that a few blossoms showing the graceful outline and contrasting leaves are really more pleasing to the eye than a great crowded bunch? Surely, after all these decades of Japanese art, we ought to have a generation growing up that has learned to appreciate the beauty of a single spray, be it rose, bamboo or pine, and the eye thus trained will soon learn that those able to go to see the flowers in their natural surroundings will care but little for a bunch in a vase. For the pleasure of those unable to ramble in wood or meadow let us bring home a few of the beauties — moss, grass, sedge, fungus, fern and flower, and arrange them as far as possible to imitate their natural surroundings — yet what columbine in a vase begins to compare with the graceful beauty of a columbine nodding on a rocky ledge?

I once read* a pleasant account of a place a friend visited in the country where the profusion of blossoming wild plants pressing up close to the house and garden filled her with amazement—thick beds of violets and wild pink in the spring—ranks on ranks of cardinal flowers and gentians in the fall, and other flowers in their season between. "How do you manage to have so many?" my friend exclaimed. "It is the children," replied the mother. "I have taught them to love the flowers as they grow—to protect and care for them, and not think they must be always plucking them; it requires some resolution not to gather a flower, but if they cannot practice self-command now, how are they to learn it when they grow up?"

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* S. Minns. Rights Due to Wild Flowers. "The Little Unity," Aug. 1, 1882. (The same in "The Cheerful Letter," July, 1898.)

Children thus brought up will be welcome visitors everywhere; they will not gather the single spike of fringed orchis that we have been enjoying for a week on the hill-path, nor the clump of black-eyed Susans that nodded to us every time we stepped out onto the piazza, nor the starry campion that sowed itself in the oval; and still less will they maraud over the place, plucking every one of the field lilies that are so handsome standing erect and stately, with the sun streaming through the red petals, against a background of grass and bushes, and look so common-place in a great crowded bunch. When we first established ourselves at Cape Ann we heard that these lilies had been nearly exterminated by people digging up the bulbs for sale, and we resolved that not only should our bulbs be protected, but the flowers should be allowed to go to seed and propagate the plant in that way, and a lively time we had of it in lily season; we saw that there is some excuse for people who surround their places with stone walls and iron gates; grounds bordered by imaginary lines conecting boundary-stones deeply hidden in the bushes stand little chance of being considered private, and those who live all the year in the country do not realize that city people find one of the chief delights and refreshments of their summer outing to lie in the wild nature surrounding their cottage at the shore or in the country, and that they care far more for their bunch berries and ferns, their sandpipers and woodchucks than for garden roses and heliotrope. I have heard an old sea captain speak in the most scornful way of a gentleman who had erected a sign "Please Do Not Pick the Wild Flowers" in the midst of the beautiful wild growth which covered his little place. Not to let every passer-by break off the creamy viburnum blossoms which overhung the road, and pluck the red lilies or tear up pink bindweed seemed to this good old sea captain the acme of selfishness, although the owner of the place had shown a very unselfish interest in his neighbors and had done much for the good of the village.

Let us then establish letters, talks, classes and societies to interest every one in the life of plants; let us teach them to care for the plants as individuals, to be interested in watching them *in situ*, to study the growth of the shoots the twining and climbing of vines, the way the flowers are fertilized, which insects visit which flowers, which the plants guard against, and all curious facts about seed-dispersion, and it will soon cease to be an aim merely to gather as large a bunch of flowers as possible, and then perhaps to tire of it and throw it down, wilting, in the the dusty highway.

A useful tract to influence young children is "Grandmother's Spring," by Mrs. J. H. Ewing. I fear it is now out of print, but pressure should be brought to bear upon the publishers* for a new edition; it is a small thin picture-book, with chromo-lithographs on every page, the text being squeezed into the sky or other small areas of vacant space. I quote as briefly as possible the moral, which is what the old grandmother says to the children when they are going a-maying:

"Little kings and queens of the May,
Listen to me;
If you want to be
Every one of you very good,
In that beautiful, beautiful, beautiful wood,
Whatever you pluck,
Leave some for good luck;
Picked from the stalk or pulled up by the root,
From overhead or from underfoot,
Water-wonders of pond or brook,
Wherever you look,
Or whatever you find,
Leave something behind:
Some for the Naiads,
Some for the Dryads,
And a bit for the Nixies,
And the Pixies.

"Harken, my child:
There is nothing more destructive and wild,
No wild bull with his horns,
No wild briar with clutching thorns,
No pig that routs in your garden bed,
No robber with ruthless tread,
More reckless and rude,
And wasteful of all things lovely and good
Than a child with the face of a boy and the ways of a bear,
Who doesn't care,
Or some ignorant little minx,
Who never thinks:
Now I never knew so stupid an elf
That he could not think and care for himself.
Oh! little sisters and little brothers,
Think of others and care for others.
And of all that your little fingers find,
Leave something behind."

In another picture book of the same series,† a similar moral ends the story of "The Old Willow Man,"—

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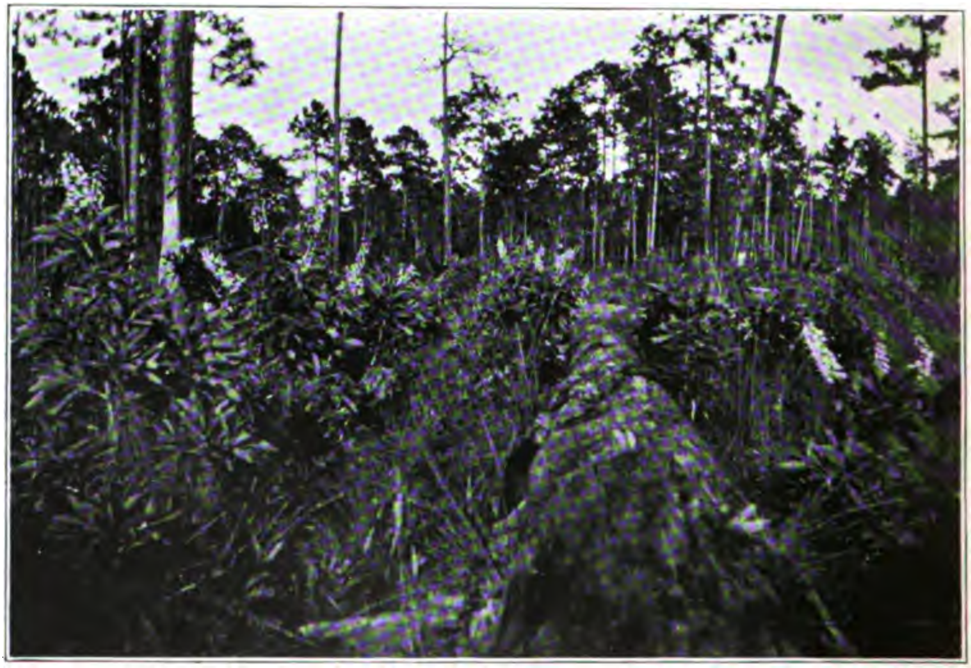
* London: Society for Promoting Christian Knowledge; New York: E. & J. B. Young & Co.

† "Boy and Squirrel."



Scene showing growth of *Elliottia racemosa*.

"Oh, children! who gather the spoils of wood and wold,
From selfish greed and wilful waste your little hands withhold.
Though fair things be common, this moral bear in mind,
Pick thankfully and modestly and leave a bit behind."

The Audubon Societies for the Preservation of Birds send out traveling lecturers, accompanied by a lantern and slides; I hardly think our work can be done in the same way, but might we not accomplish by means of a travelling lecturer who would go about to different towns giving talks, which, having the interest of the personal element, might be heeded where circulars, placards and pamphlets would fail to influence? If he could also interest his hearers in making a list of the plants of their township or county they might be stimulated to protect their plant-species, and forbid their being shipped to distant cities.

BOSTON, MASS.

NOTES ON ELLIOTTIA RACEMOSA.

BY ROLAND M. HARPER.

IN the Journal of the *New York Botanical Garden*, last August, Dr. Small has reported my rediscovery of the rare shrub *Elliottia racemosa*, which had not been known in the wild state for over twenty years. But as he did not go into the history of the plant very extensively, and at the same time did not quote my remarks correctly, I have prepared these additional notes on the subject, in order to summarize as completely as possible the existing knowledge of the species.

The name *Elliottia racemosa* was first used by Dr. Muhlenberg in 1813, in his Catalogue of *North American Plants* (p. 40), but the first description of the genus with its single species appeared four years later in Elliott's Botany of South Carolina and Georgia (1: 448), and the publication of the name therefore dates from that point.

Elliottia seems to have been discovered by Elliott himself, near Waynesboro, Burke County, Georgia, but the exact date of the discovery is not at present known. In *Reliquae Baldwinianae*, which consists mostly of the correspondence between Dr. Muhlenberg and Dr. Wm. Baldwin, compiled by Dr. Darlington, and published in 1843, there are several interesting references to this plant. The first is in a letter from Muhlenberg, dated April 20, 1813, where he says: "Have you observed in your travels, an Octandrous plant, which Mr. Elliott discovered, and which, in my catalogue, I have named *Elliottia racemosa?* I wish to have information concerning the *fruit*, whether it it is a *Capsula*, or *Bacca*. Mr. Oemler had the shrub, once, in his garden." His catalogue had not been published at that time, but appeared several months later.

In several subsequent letters Dr. Muhlenberg expresses his desire to get better specimens of *Elliottia*, and especially to see its fruit. To these inquiries Dr. Baldwin replies, from St. Mary's, Georgia, on June 17, 1814, as follows: "I have not seen the *Elliottia;* and Mr. Elliott informed me that he was fearful it would turn out to be only an Octandrous *Clethra*." Writing from Savannah, on Jan. 3, 1815, he says: "The *Elliottia*, Mr. Oemler informs me, is found in the neighborhood of Waynesboro. Roots shall be procured, if possible."

The Mr. Oemler referred to, as I have recently ascertained by correspondence with one of his grandsons, was Dr. Augustus Gottlieb Oemler, a botanist who seems to have collected extensively in South Carolina and Georgia, and corresponded with Baldwin, Elliott, Muhlenberg and others. He was the discoverer of *Coreopsis Oemleri*—now regarded as a variety of *C. major*—named for him by Elliott. Some of his descendants are living near Savannah, at the present day.

Dr. Chapman's description in the first edition of his *Flora* of the Southern States (1860), is practically the same as Elliott's, and the only locality mentioned is Waynesboro, though the plant had in the meanwhile been collected near Augusta, by Wray and by Olney.

Wood, in his *Class Book*, (edition of 1873), gave a good description of *Elliottia racemosa*, and mentioned its having been collected near Augusta, by Mr. P. J. Berckmans, who is a prominent horticulturist of that city, and has kept the species growing at his establishment for the last twenty-five years or so.

In the *Bulletin* of the Torrey Botanical Club for December, 1873, is a note by Dr. Thurber, to the effect that specimens of *Elliottia* collected by Mr. Berckmans near Augusta were distributed at the meeting of the club on October 28th, and that Mr. Berckmans had been requested to procure fruit, if possible. Dr. Thurber, further remarks: "The plant, through the kindness of Mr. Berckmans, will soon be in cultivation, and then we may discover to what the lack of fructification is due." I do not know that the plan for cultivating it in New York at that time was ever carried out, however. In the same journal for March, 1876, Mr. H. W. Ravenel, writing of "some rare Southern plants," mentions going out with Mr. Berckmans to a station for *Elliottia*, ten or twelve miles west of Augusta, in the sand-hill region (probably in Columbia County), where there were a large number of the bushes, four to ten feet high (nearly every description gives these same dimensions for the plant), covering perhaps an acre or more. Mr. Ravenel visited this locality in September, 1874, and July, 1875, but found no trace of fruit at either time. The species seems to have disappeared from the vicinity of Augusta shortly after this.

Mr. A. Cuthbert, of Augusta, informs me in a recent letter that there are many specimens of *Elliottia* from Waynesboro in the herbarium of Dr. T. P. Cleveland, who collected around Augusta and in other parts of Georgia before the civil war. But I am not aware that any search has recently been made for the plant near Waynesboro, or at the other locality mentioned by Elliott, namely, near the Oconee River.

Two figures of *Elliottia* have been published; one in *Garden and Forest* for May 23, 1894, and the other in Miss Alice Lounsberry's *Southern Wild Flowers and Trees*, published in September, 1901. Each figure is accompanied by some descriptive matter, stating some of the facts which I have already mentioned.

Some of the older specimens referred to by Dr. Small are in the herbarium of Columbia University. The only specimen in the United States National Herbarium, besides mine, was distributed through the Biltmore Herbarium, and came from a plant on the grounds of Mr. Berckmans, said to have been transplanted from its native habitat about 1878. Miss Lounberry's figure was doubtless drawn from a similar specimen.

Elliottia seems to have been first placed in Ericaceae by De Candolle in his Prodromus (72: 590) in 1839, and this disposition of it has been followed by most authors. In Engler and Prantl's Natürlichen Pflanzenfamilien it is the first genus in the family, in the tribe *Rhododendroideae-Ledeae.* Its nearest relative among North American genera seems to be *Bejaria racemosa,* which also inhabits the southeastern United States.

Two Asiatic species are by some authors considered congeneric with *Elliottia racemosa,* and by others placed in a separate genus, *Tripetaleia.* The latter view is the one taken by Engler and Prantl.

Now as to my own experience with *Elliottia.* On the afternoon of June 27, 1901, I went out to collect specimens on some sand hills in the vicinity of the house where I was stopping, near Bloys, Bulloch County, Georgia, accompanied by my friend Prof. J. W. Hendricks (whose guest I was at the time), who has always taken a great interest in my botanical work. While I was stopping to collect some other plants, Prof. Hendricks went ahead on his bicycle through the open pine woods, and in a few minutes returned with a flowering branch of *Elliottia* to ask me what it was. I did not know it at that time, but went ahead with him to see for myself. After collecting as many specimens as I wanted, and about a dozen other species, I returned to the house, and on looking it up in Chapman's Flora, I soon saw what a prize I had. My uncertainty as to its specific identity, when writing to Dr. Small about it a few days later, was due to the fact that Chapman's description (like most others) says nothing about the size of the flowers, and I had imagined them to be much smaller, like those of the *Cyrillaceae,* in which family Dr. Chapman placed it. At the time the specimens were secured I was not prepared to photograph the plants, but two days later I revisited the spot and took the photograph which illustrates this paper. Probably at least a hundred specimens were seen in all, scattered over several acres, most of them bearing about a dozen ascending racemes of pure white flowers, but some of them (perhaps younger plants) without any flowers at all. The specimens were mostly about four or five feet tall. In habitat the species seemed to prefer the so-called "oak-ridges" in the pine barrens, which are slight elevations covered with a very dry sandy soil and characterized by a growth of several small species of oaks, principally *Quercus Catesbaei* and *Q. Margaretta.*

Elliott gives its habitat as "rich soil," and Gray says "wet sandy woods." If these statements are true the habitat is somewhat variable.

I can add little to the published description of this species, except that the flowers are irregular in much the same manner as those of some species of *Azalea,* the two upper petals being recurved more than the two lower ones. The buds are drooping, but the open flowers horizontal. The style is long-exserted, and abruptly bent upward at the apex, as noted in some of the descriptions.

An interesting fact is that the flowers were frequented by large numbers of insects (I did not notice whether more than one species), which seemed to be enjoying the nectar immensely. One would suppose that this would ensure fertilization, but apparently it does not, for no fruit of *Elliottia racemosa* has yet been seen. I went to another part of the state a few days after collecting this species, but I left instructions with Prof. Hendricks to watch it and see if any fruit was formed. A few weeks later he wrote me that he had visited the spot again, and that the flowers were mostly gone, but that the ovaries dropped off without maturing. So the mystery of *Elliottia* remains unsolved. It is barely possible that some insect which formerly carried the pollen from one flower to another is now extinct, and that those which now visit the flowers are not of the right size, or otherwise unadapted to perform this function. To throw some light on this question, if possible, Mr. Cuthbert intends to experiment this year with the specimens on the grounds of Mr. Berckmans, and fertilize the flowers artificially.

The existence of *Elliottia* must be a precarious one, since it no longer produces seed, but probably spreads only from the root, and it is doubtless only a question of time when the species will be extinct. It must have suffered greatly in some places from the fires which sweep over the pine barrens in winter. These fires are set for the purpose of destroying the dead grass to facilitate grazing, but do more harm than good in destroying many of the pine trees, both old and young.

I have no doubt, however, that our *Elliottia* will ultimately be found at many more points than those from which it has already been reported, for there are thousands of square miles in Southeast Georgia where no botanist has ever trod, and innumerable places where the conditions seem favorable for it.

AMONG FLORIDA FERNS.

By A. H. Curtiss.

[concluded]

I at once removed the packages, which I knew were full of mold, and packed them in boxes, which, with my boat, I had moved across to Salt Lake, where a small steamer was expected to arrive the next night. That night I spent on my boat in a cypress swamp, and enjoyed a sense of security which I had never felt on the lagoons, where, as a rule, there is nothing to break the ocean winds. The next morning my precious freight was placed on board the steamer, and then, hoisting sail, with my negro boatman I started for Jacksonville, distant about 200 miles "as the river meanders." In the fall the country bordering the upper St. Johns is in a state of inundation. Its course is then best indicated by the line of most rapid current. The scenery consists of watery palmetto forests, overflowed prairies and lakes without visible banks.

After sailing for about two hours, I spied a few specimens of a strange floating plant, but with a brisk wind and rapid current we were traveling too fast for herborizing. Going forward with a long oar and throwing one arm around the mast, I waited for another specimen and before long had one on deck. There was nothing about it in the least suggestive of *Thalictrum*, yet I felt convinced that it was *Ceratopteris thalictroides*. Resuming my lookout, I soon discovered a large number of the plants back of some tall grass bordering the channel. To reach them we threw the anchor out among the grass and pulled in on the rope until we were among the plants, when I made a large collection, about 125 specimens. To press all these large, watery plants was the most formidable task in this line I had ever undertaken, and it might have proved impracticable had not my presses been empty. I first placed the plants in some empty boxes and let them drain as much as they would until the next morning. Later in the day I secured a set of a handsome floating grass, *Paspalum fluitans*, and one of the great *Sesbania macrocarpa*.

When night arrived we had seen no land and could do no better than tie up to a palmetto. We had been sailing among palmettos almost continually, and it was unpleasantly evident that if our worm-eaten boat should strike a snag or stump we might be glad to find refuge in the top of a palmetto and try to hail the steamer that would be coming along a night or two later. During the second day our surroundings changed somewhat for the better. We crossed several lakes and came to where the river had visible banks. We saw one house which some misguided person had built during a dry season, with water up to the eaves. We also met two human beings (negroes) on a lighter, and in a bad plight, according to their story.

At the landing called Blue Springs I found more of the *Ceratopteris*, but the plants were not well developed. Near here I made collections of *Carya aquatica*, and of the stately *Thalia divaricata*. As we entered great Lake George I was trying hard to reach the last of my *Ceratopteris* specimens, with my press on the lee side of the centerboard, but before long the spray compelled me to stop. I need only add that when I reached home the next day the specimens were all pressing nicely, and that a few changes left them as dry and thin as tissue paper.

Eighteen years later, in August, 1897, I was surprised to find the *Ceratopteris* at Istachatta, on the Withlacoochee River, for it then seemed to me that where I found it before was much farther south. But the map shows that it is in about the same latitude, namely, between 29° and 28½° N. L. The three stations known to me are only 80 miles apart at the farthest. It may be incorrect to say that a freely floating plant has any stations in a river. It might even escape from the pond at Istachatta in a time of high water.

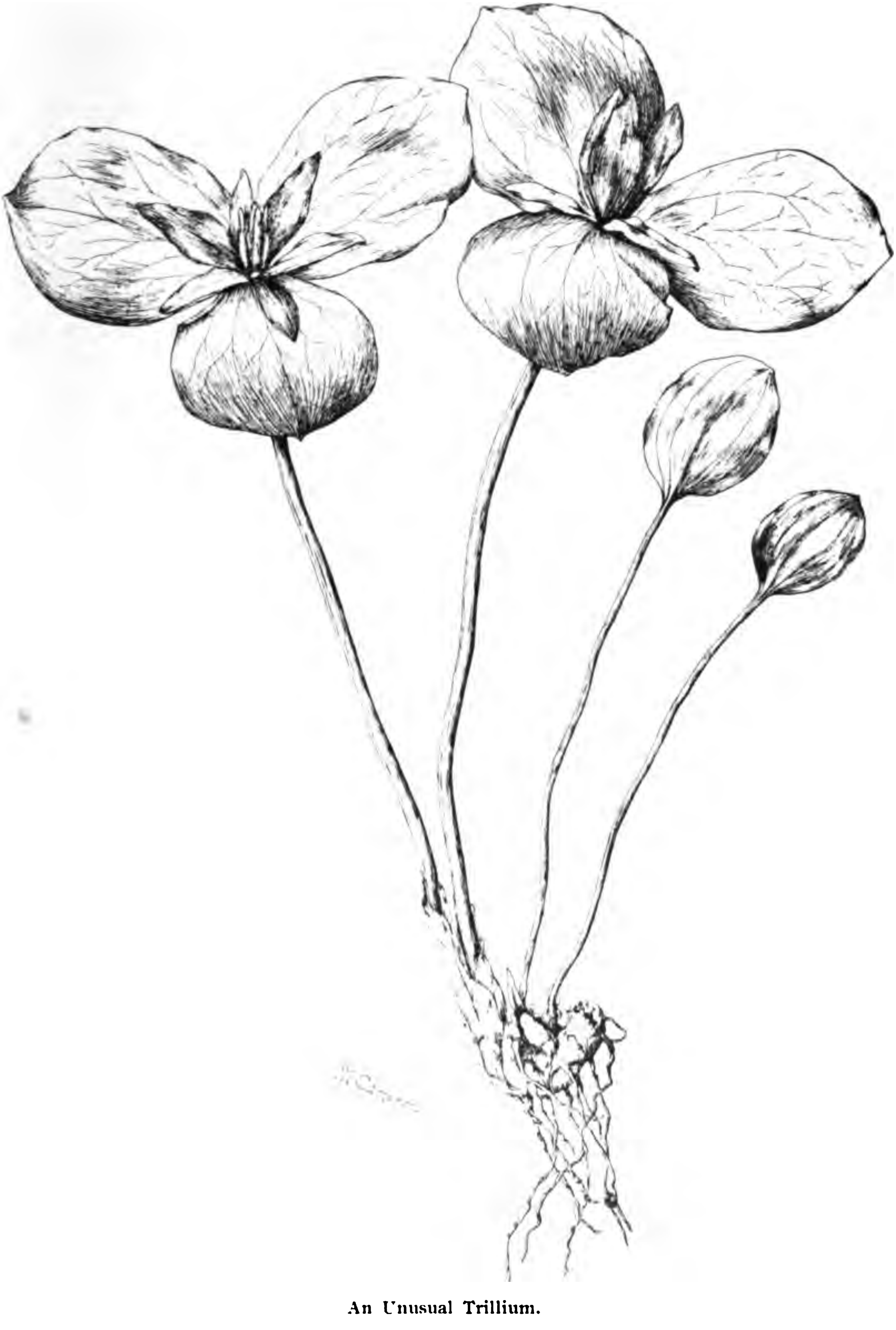
In the picture of this fern in "Eaton's Ferns of North America" there is entire omission of the curious floating leaves. These supplement the function of the fertile fronds by producing, on their edges, after the manner of *Bryophyllum*, numerous plantlets, which are set free by the decay of the fronds. Next within the proliferous fronds is a set of erect sterile fronds, which perform the functions of ordinary leaves. From the center rise the finely divided fertile fronds, which are for spore production. With such ample provision for reproduction, it would seem that *Ceratopteris* ought to be more abundant than it is.

BRIEFER ARTICLES.

"OCCASIONAL" LEAVES OF TRILLIUM.

In some of the recent manuals of our eastern native plants, under the description of the genus *Trillium*, it is stated that these plants occasionally produce from the rootstock long-petioled, simple leaves. On looking over the material in several herbaria, it was noticeable, in view of the above statement, how incomplete the proper collection of specimens of *Trillium* had been, or how truly occasional indeed is the occurrence of these seemingly basal leaves. So far as ascertained the publications referring to this character are the manuals mentioned above.

So far also, it has been impossible to locate any specimens showing



An Unusual Trillium.

these leaves. Accordingly, it was with surprise and pleasure that the writer discovered, on April 19, 1902, in rich woods along the Potomac River, in the middle of a clump of thirty or more plants of the sessile-flowered trillium (*Trillium sessile* L.), a plant bearing two of these leaves. In the accompaning drawing, executed by Miss Mausie Cameron, of Washington, the characteristics of these leaves are clearly shown. It is necessary to emphasize only the fact that these leaves sprang, each from the node nearest the apices of two very tiny branches from the main rootstock. But for the persistent bud sheaths from which these leaves were produced, it is highly probable that the branches would have escaped notice.

Now the questions arise—How often are these leaves produced? Do they occur on other than very young rootstocks or their branches? At what season do they occur in the greatest number? How widely, geographically, do they occur? How long do they persist and function? Any answer to these questions will be welcomed by the writer, whether addressed to him personally or to THE PLANT WORLD.—E. L. MORRIS, *Western High School, Washington, D. C.*

THE SNOW PLANT OF THE SIERRA NEVADAS.

Last July, while on a tour to the Yosemite Valley, I came across two or three specimens of the rare snow-plant of the Sierras, which, of all the novel and charming plants of that region of floral abundance, must take precedence; as the day that I first saw this curious blossom will always be remembered with a thrill of delight.

Starting soon after breakfast with a few companions we left the camp far behind us and turned in the direction of Glacier Point. The trail wound through various kinds of underbrush—spreading dogbane, spiraea and manzanita, and various bright blossoms passed in review as we reached the higher altitudes—columbines, daisies, Mariposa tulips, lupines, wild lilacs and alpine phlox. Presently the way grew steeper and more rocky, and the wonderful panorama of valley, mountains and falls loomed up grandly.

Near the summit, which is 3200 feet above the floor of the valley, we entered a magnificent forest of firs and cedars, through which a tiny brook frolicked amid boulders and fern-embowered nooks. There in a shadowy recess of those woodlands, with the soft glint of the sunlight playing upon it, vivifying its brilliant crimson until it seemed as though rich blood suffused its entire form almost converting it into an animated being, was our first snow-plant.

How its crimson bells glowed in the sunlight! How strangely the intense hue contrasted with the soft greens and browns of the shrubbery! This remarkable plant belongs to the heath family; and is one of those strange organisms, that, like the fungi, seem to subsist upon decaying matter. There is no green foliage, but the stiff asparagus-like stem is clothed with rather rigid scales, which are of a pale flesh color near the ground; but farther up they assume the same brilliant hue as the flowers, and there merge into floral bracts which curl gracefully about among the crimson bell-shaped blossoms.

In early summer the snow-plant may be found at an altitude of three or four thousand feet; but as the season advances and the snow fields recede they will be found higher, rarely, if ever, growing upon the snow, but always where it has just melted away.—Wm. S. Rice, *Manheim, Pa.*

THE WILD FLOWER PRESERVATION SOCIETY.

A most enjoyable lecture, on the topic, "Some Wild Flowers in Need of Preservation," by Dr. N. L. Britton, Director-in-chief of the New York Botanical Garden, was delivered in the lecture hall of the U. S. National Museum at Washington, on the afternoon of May 22d. The audience, consisting of about seven hundred people, including many teachers and pupils from the public and private schools, completely filled all the available space, and many people were turned away at the doors. Dr. Britton's lecture took the form of a running commentary on the beautiful colored lantern slides, the joint work of Mr. and Mrs. Cornelius Van Brunt, which were arranged in chronological order, illustrating first the flowers of earliest spring, and so on through those of summer and autumn. It was explained how easily many plants that appear common, like the dogwood, may be plucked in such quantities that the vitality of the shrub is destroyed, and gradual extermination in the vicinity of the larger cities is the result.

The action of the Board of Managers in admitting to charter membership all who enrolled on or before May 22, caused many persons in the audience to avail themselves of the privilege after the lecture, and the membership in the National Capital is now most encouraging. Chapters are to be formed at once in the larger cities and towns throughout the country, and every one interested in helping on this work is invited to correspond with the Secretary. We want to establish funds for several distinct lines of activity; first, the printing and distribution of essays and other reading matter for the use of schools particularly; the expense of this will be reduced to a minimum inasmuch as most of this matter will be printed in THE PLANT WORLD and struck off in the form of separates. Second, a fund is required to pay the expenses of lectures in the large cities, it having been demonstrated in Washington that a public illustrated lecture is far more effective than any other amount of personal solicitation. Third, a small sum is required for clerical services in connection with the offices of the Secretary and Treasurer. It must therefore be remembered that *every dollar* counts in the work of plant protection, and that money is more urgently needed at the outset than later, when the Society becomes well established.

The Board of Managers met in Washington on May 22d and transacted routine business. At the public meeting, upon motion of the Secretary, it was unanimously voted to elect as honorary members of the Society the Misses Caroline and Olivia Phelps-Stokes, whose donation of $3,000 to the New York Botanical Garden furnished the original inspiration for the Society.

We subjoin the Constitution of the Society, for the benefit of members interested in its provisions:

CONSTITUTION.

ARTICLE I.—NAME.

The name of this organization shall be the Wild Flower Preservation Society of America.

ARTICLE II.—OBJECTS.

The objects of this Society are:

1. To encourage the preservation and protection of native plants.
2. To secure the better enforcement of present laws governing such preservation.
3. To induce such further legislation as shall be deemed advisable.

ARTICLE III.—MEMBERSHIP.

1. Any person in sympathy with the aims of the Society may become a member thereof by enrolling as such and by payment of the dues below specified.

2. There shall be three classes of members: Active members, who shall pay one dollar per annum; Fellows, who shall pay not less than twenty-five dollars at one time; and Patrons, who shall pay not less than one hundred dollars at one time. Fellows and Patrons shall be exempt from the payment of further dues. All members shall be entitled to vote and hold office.

ARTICLE IV.—OFFICERS.

The officers of the Society shall consist of a President, a Vice-President, Honorary Vice-Presidents, a Secretary and a Treasurer. These, with twelve members-at-large, elected as hereinafter prescribed, shall constitute the Board of Managers.

2. The duties of the President, Vice-President, Secretary and Treasurer shall be such as usually pertain to those offices.

3. Officers shall be elected annually by the Board of Managers, and shall hold office until their successors are chosen.

ARTICLE V.—PUBLICATION ORGAN.

The Board of Managers shall be empowered to designate some periodical as the official organ of the Society, and to make such financial arrangements as may be necessary to insure the free distribution of such journal to the members.

ARTICLE VI.—BOARD OF MANAGERS.

The management of the Society shall be vested in the Board of Managers, which shall elect all officers, appoint all other committees, administer funds, arrange for publication and meetings, and transact other business. They shall prepare and print in the official organ in advance of each annual meeting a report of their operations for the current year.

ARTICLE VII.—MEETINGS.

1. The annual meeting of the Society shall be held in December of each year, at the call of the Board. At this meeting the reports of officers shall be read and announcement made of elections to the Board of Managers.

2. Meetings of the Board may be held under such conditions as they may prescribe. Five members shall constitute a quorum.

ARTICLE VIII.—ELECTIONS.

1. Members-at-large of the Board of Managers, shall be divided originally by lot into three classes of four members each; those in Class I shall serve until December, 1902; those in Class II until December, 1903; and those in Class III until December, 1904. Thereafter, each class shall be elected for a term of three years.

2. Elections of members to the Board shall be conducted as follows: On or before October 1 of each year, the outgoing Board shall prepare a list of not less than two nominations to each vacancy, and shall print the same in the next issue of the Society's official organ. Any ten or more members of the Society may thereafter file with the Secretary additional nominations, the revised list being printed in the succeeding issue. Members may then forward their ballots by mail to the Secretary at any time before the date of the annual meeting in December, the polls closing at 12 M. on that day. The four or more persons receiving the highest number of votes shall be declared elected as members of the Board of Managers.

3. Vacancies occurring by resignation or otherwise may be filled by the Board until the date of the next annual election, when they shall be filled by nomination and ballot in the manner above prescribed for regular vacancies, the terms of successful candidates being adjusted on the principle of the largest vote to the longest term.

ARTICLE IX.—LOCAL CHAPTERS.

Any five members of the Society may organize local chapters of the latter, and may make such rules for government as they may deem necessary, provided such rules do not conflict with any of the provisions of these By-Laws, and provided further, that all publications issued by such chapter be first submitted for approval to the Board of Managers. In addition to their regular membership dues, which must be paid to the Treasurer of the Society, members of the local chapters may raise and disburse such funds as they may deem proper, for forwarding the objects of the Society.

ARTICLE X.—AMENDMENTS.

These By-Laws may be amended at any meeting of the Board of Managers by a two-thirds vote of the members present, notice of the proposed amendment having been submitted in writing to all the members thereof at least two weeks previously.

GENERAL ITEMS.

Recently, in exploring a small wood covering about four acres, through which flowed a brook, we found the following varieties of ferns. As there were no rocks, the soil being somewhat moist and swampy, of course none of the rock-growing species were present. *Adiantum pedatum, Pteris aquilina, Asplenium thelypteroides, Asplenium Filix-foemina, Dryopteris Thelypteris, Dryopteris Noveboracense, Dryopteris cristata* var. *Clintoniana, Dryopteris spinulosa, Dryopteris marginalis, Dryopteris acrostichoides, Cystopteris bulbifera, Onoclea sensibilis, Dicksonia punctilobula, Osmunda cinnamomea, Osmunda interrupta.*

All of the above are abundant in this region, eastern New York, with the possible exception of *Asplenium thelypteroides* and *Dryopteris cristata*, which we do not remember to have seen in any other situation. It is seldom that so many varieties are found in so small an area. Nearly all were found on a space of less than an acre.

FRANK DOBBIN.

One of the daintiest of wild flowers of June is the blossom of that time-honored concomitant of roast turkey, the cranberry. While, however, everybody knows the berry, few are acquainted with the flower, for the peat bogs where it blows in the choice fellowship of the stately pitcher plant and the golden club, and of many a rare orchid, are quite remote from the beaten paths of travel.

The cranberry plant is a small, slender, somewhat trailing shrub, with the neatest of evergreen leaves, from amid which a few thread-like stalks lift their nodding flowers. When fully expanded the pink lobes of each corolla are curled back like a lily's, and from the heart of them the compressed stamens protrude in the shape of a spear point or a beak. The imaginative may see in this long-beaked little blossom, shown in the accompanying drawing, a resemblance to a tiny crane's head, whence some hard-pressed etymologist has thought to derive the word cranberry — that is, crane-berry.

Those who like to make a place on the home table for oddities and rarities of the plant world, may well include in their list for June a few sprays of the cranberry vine in bloom — the unfamiliar, alert blossoms, looking brightly out from their green bower, being sure to delight all flower-loving visitors.—*Country Life in America.*

EDITORIAL.

In a recent number of *Science* Dr. C. E. Bessey remarks upon the growing tendency in systematic botany toward what seems to many to be an undue multiplication of species. For example, *Crataegus*, or the thorn-apples, were contained in less than a dozen species a few years ago, but are now held to embrace as many as 225 species. The blue-eyed grass (*Sisyrinchium*) has been multiplied from 2 to nearly 75 species; the violets from 50 to 150 species, etc. It seems hard, indeed, to believe that the older systematic botanists could have been so blind as not to have been able to see some of these things. The whole question naturally hinges on the definition of a species. There never has been, and doubtless never will be, complete agreement among biologists on this point. Perhaps botanists may learn to their advantage from the ornithologists regarding the definition of a species. The ornithologists hold that when the members of one group of individuals differ from the members of another group by *one or more* constant, definable characters, then both are to be ranked as species. When there is a complete line of gradations between the sets, the last to be named is called a sub-species. But the field of ornithology is narrower than the field of botany, for there are less than 1,200 species and sub-species of North American birds, as compared with 16,000 flowering plants and probably a larger number belonging to the lower orders. It has thus been possible to obtain large series of birds from all portions of the country to serve as a basis for working out these minute differences. If all the collections of plants in North America were combined they would not be comparatively as complete as for birds.

Botanists are not responsible for the variations of plants in nature, and if the differences are recognizable there can be no valid objection to their being named. We can only urge that haste be made slowly in this "splitting" process, and only after the most careful study and comparison of large series of specimens. It must be very discouraging to the layman and amateur to find the one or two species of a genus with which he supposed himself familiar, suddenly split up into a dozen or twenty named species. One undoubtedly good effect will be to direct careful attention and study to the groups that have been divided. Much of this work, perhaps most of it, may stand the test of time, but some of it is already repudiated, and it would be well to recall the absurdities that have been foisted on the public by certain European writers in the shape of segregates from *Draba verna*, and in the vast multiplication of species in *Rubus*, *Rosa* and *Hieracium*.

BOOK REVIEW.

THE MICROSCOPE AND ITS REVELATIONS. By the late Wm. B. Carpenter. Eighth edition, enlarged and revised by the Rev. W. H. Dallinger. 8vo., 1181 pp., 22 plates, and nearly 900 wood engravings. P. Blakiston's Sons & Co., Philadelphia, Pa., 1901.

In the last revised edition of this classic work we have what might be termed an encyclopedia of microscopy, as there is scarcely a subject to which the microscope bears direct relation concerning which one cannot find information in this volume. The time has long since passed when the microscope was regarded as an instrument whose chief use was to provide innocent amusement for amateur microscopists. It is now an indispensable accessory in numerous lines of scientific research, as well as industrial and economic pursuits. Our readers will be more particularly interested in the portion of the work devoted to the microscopic structure of the vegetable kingdom, included in pages 530 to 725. A more or less complete outline is here given of the various groups of plants, particular attention, of course, being given to the lower and simpler forms. The illustrations are numerous and excellent. The treatment does not include some of the most recent knowledge regarding some of these forms, but is mostly accurate. C. L. S.

THE PLANT WORLD

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HOW SHALL OUR WILD FLOWERS BE PRESERVED?*

By A. J. Grout.

THE problem of the preservation of our wild flowers is most acute in the vicinity of our towns and cities, for it is here that flowers suffer most from indiscriminate gathering.

In rural localities there are at least three situations or conditions that demand attention. The gathering of some particularly attractive wild flower for city markets; the search for some rare and local plant and its excessive collection because of its very rarity; and the clearing of forest areas or the draining and clearing of swamps for economic reasons, so changing the conditions that very many of the native plants are unable to exist.

The almost complete extinction of the trailing arbutus in many localities where it was formerly abundant furnishes too good an illustration of the damage done by the collecting of attractive wild flowers for the city markets.

The danger of rarities from over-enthusiastic admirers is well illustrated by the case of the climbing fern (*Lygodium*) which would have been nearly or quite an extinct species by this time if measures had not been taken to preserve it.

In these two cases the conditions are so similar to those that have obtained in the case of game birds and other inoffensive wild animals that it seems certain that similar remedies will produce similar desirable

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*Awarded the third prize of twenty dollars, competition of 1902, from the Caroline and Olivia Phelps Stokes Fund for the Preservation of Native Plants. Reprinted from the *Journal of the New York Botanical Garden*.

results. In other words, our societies for the preservation of native wild flowers should exert their energies to secure the enactment of stringent laws for the protection of such plants as stand in need of it in their localities. The sale of flowers like the trailing arbutus should be stopped and the collection of plants like the climbing fern should be absolutely prohibited, except by the accredited agents of scientific institutions.

It will take time to educate public sentiment until it will secure adequate enforcement of such laws, just as it has taken time to educate public sentiment up to the point of enforcing the laws for the protection of game and song birds, but the sooner the agitation is begun, the sooner will the desired results be obtained. For public opinion follows, not leads, in such matters. The need for action is the more urgent from the fact that it will soon be too late to save some of our most beautiful plants from extinction in settled localities, the very place where they will do the most good.

The cutting of forest and the reclaiming of swamp and moor areas presents an entirely different problem, which must be met in a different way. Where the land is sufficiently valuable to pay for the reclaiming of it for agricultural or building purposes, little can be done, except by the incorporation of such areas into public parks where they are situated near enough to cities to warrant it. Even then the landscape gardener will very likely improve (?) the native plants out of existence. Forest Park in Brooklyn and Van Cortlandt and Bronx Parks in the Borough of the Bronx, New York City, have been conspicuous examples of beauty of nature unadorned by art.

To the writer a trip to Van Cortlandt Park is productive of a pleasure that the glories of Central Park can never even approximate. One of the greatest attractions at the Botanical Gardens in Bronx Park is due to the intelligent preservation and care of the native plants in many of the most beautiful spots. Flower lovers in New York and other large cities owe it to themselves and to the ideals they represent to see to it that measures are taken to preserve untouched such spots as the woodland and swamp in Van Cortlandt and Forest Parks.

The forestry agitation and the forest reservations will, of course, tend to preserve woodland plants of all kinds, and flower lovers should reinforce the forestry associations at all possible points.

The pulp mill is without question the most dangerous enemy of our forests. The ordinary lumberman will leave enough young trees standing to practically reforest the lumbered areas in twenty years, but the pulp-wood cutter leaves nothing but desolation.

The Green Mountains in southern Vermont have been the scene of lumbering operations for years, but the forest areas rapidly renovate themselves, so that little damage is done to the native flora; the land still retains its moisture and is not subject to any considerable degree to forest fires. Contrast this with the state of affairs in the southern Adironack region, where the insatiate pulp mill has taken everything worthy the name of tree, and where destructive forest fires burn up, not only the surface vegetation, but the very soil itself, as it is in many places so rich in vegetable matter as to be combustible to a considerable extent. The man who shall invent a cheap and satisfactory substitute for wood pulp for paper will do more for forests and flowers than all the legislatures in the country could accomplish in a century.

The problem of preserving wild plant life in the vicinity of large cities and towns stands distinctly by itself. Except in a few cases, as outlined above, it is not a problem to be reached by law, but by enlightened public opinion. The police regulations may in a measure protect the park areas but in the larger and wilder parks police protection to be adequate would be burdensome beyond endurance, both to the taxpayer and the lover of nature. I, for one, can never enjoy nature while under the surveillance of a blue-coat. He is a rank and jarring discord in what otherwise might be a soul-stirring visual symphony.

A great proportion of evil is wrought through ignorance and thoughtlessness which can be reached through the usual channels of popular education, the lecture, the newspaper, and the school.

There is a right way and a wrong way to pick flowers. Many kinds if properly gathered can be picked continuously throughout the period of bloom without materially injuring the plants. Others must be picked sparingly, and some not at all.

If rules something like the following were iterated and reiterated in the public prints, with fairly complete lists of the local plants in each of the classes mentioned (for the composition of these lists would vary greatly in different localities), I believe it might do much to save our native wild flowers from needless and thoughtless destruction. And we of the city might still enjoy our bouquet of wild flowers with a clear conscience.

Flowers of any kind should not be gathered near walks or drives. They give the most pleasure to the most people in their natural situation, and they are most exposed to injury from thoughtless people and vandals.

As little as possible of leaf or leaf-bearing shoot should be gathered with the flowers, and underground stems or roots should never be disturbed. The violation of this rule is responsible for much of the damage done the trailing arbutus.

Rare or unusual flowers found near a city should not be gathered except for strictly scientific purposes. This, of course, does not apply to plants which are plainly weeds or introduced plants.

In the case of annuals, flowers enough to furnish plenty of seeds for next year must be allowed to remain on the plants.

Flowers with long stalks, like water lilies and violets, which can be picked without injuring other portions of the plant, can usually be gathered freely with little danger of injury to the plants as a whole. It is well known to floriculturists that flower production is much less exhausting to the plant than the production of seeds, and that to get the greatest yield of flowers the blooms must be picked as they open. This principle will apply to wild flowers as well as to those under cultivation.

Experience, moreover, bears out this belief, for violets are gathered as freely as any of our wild flowers, yet they seem to thrive and increase even in the places where they are likely to be gathered most. This may be due in part to the cleistogamous flowers which never appear above ground. But neither does the water lily seem to be suffering, although marketed freely. As before stated, local lists of similar flowers could be easily made up by any competent local botanist.

Flowers can be gathered in moderation from flowering shrubs and trees without material injury to the plants if little of the wood and leaf-bearing shoot be removed and care be taken to select flowers from different portions of the plant. For instance, it is a decided advantage to apple trees to have some of the flowers removed in seasons of very full bloom. But is is far from an advantage to have whole branches torn off bodily and all the lower flowers entirely removed, as is so often done with the apple trees and with the dogwoods in the vicinity of New York City. There are flowering dogwoods enough in its vicinity to give pretty nearly all comers a moderate cluster if properly gathered, but at the present rate and methods of collecting there will soon be none for any one. The locusts, sweet pepperbush and the various species of viburnum belong in a similar class.

Many of our most interesting wild flowers, especially those of early spring, arise from a thickened underground portion, rich in stored nutriment, and while in many cases the flowers cannot be collected without taking the leaves also, the underground portion (rootstock, tuber, bulb, corm, etc.) will easily supply the loss, if not too frequent or severe. Such flowers, for example, as the spring beauty, Jack-in-the-pulpit, bellworts and anemones, can be gathered in moderation in the more secluded portions of the city environs. In these cases special care should be taken to avoid injury to the underground portion, although in many cases nature herself has looked out for this by burying this portion of the plant deeply in the soil. If any one doubts this, let him try to dig a few corms of the adder-tongue lily (*Erythronium*).

Then there is a class of flowers ordinarily classed as weeds, yet beautiful withal, and so sturdy and difficult of destruction that they can nearly always be collected without compunction. Such are daisies, buttercups, wild carrot, dandelions and others.

There are other flowers in every locality that should not be gathered at all, but it is doubtful whether a list of such would not induce certain irresponsible persons to hunt them down. If good full lists based upon the same principles as those given above were easily accessible to every one, I believe it would aid greatly in the matter of popular education and would act as a restraint on the more public-spirited portion of the community.

As before stated, the usual channels for popular instruction must be our main reliance. Newspaper agitation is slowly but surely making it bad form. It has always been poor taste to wear the plumage of our wild birds, and the same agency properly utilized will make any right-minded person ashamed to collect great handfuls of our wild flowers only to throw them away as soon as they wither a little in the hand. Fewer flowers will be picked, and those few will be carefully cherished, so as to please for days instead of minutes.

The place of places for public instruction is the schoolroom, although newspapers, books and lectures have done much for animals and will do much more for plants. Every teacher of botany and every teacher of nature study should be sure to imbue his pupils with an idea of the sanctity of plant life. Here is a field which some flower-lover of the artistic and literary ability should enter at once. For a well-told story is the strongest method of rooting ideas so deeply in childish minds that they will bear fruit in action. Black Beauty, overdrawn and unreal as it is, by its vivid portrayal of the suffering (real or imaginary) of the horse, read in thousands of schools, has done incalculable good in making children more thoughtful of the comfort of their animal pets and companions and more considerate in their treatment of them.

Something similar is needed properly to impress children with the fact that flowers need their care and consideration, and may suffer deformity and death if misused, although actual pain may not be possible to them.

I would respectfully suggest that the next prize from The Olivia and Caroline Phelps Stokes Fund be offered for stories of this sort, suitable for reading in the primary and grammar grades.

I may have used the term "Societies for the preservation of native wild flowers," unadvisedly, for few local societies have as yet been formed. Every botanical club and society should at once organize itself into such a society and furnish a large membership for the central organization already formed.

Let each such club begin at once to study local needs and the best means of meeting them. The plants in need of protection should be noted and means taken for their protection, lectures should be given and literature distributed. There are enough such clubs already in existence to carry out the needed measures with success, and it is to these that this article is addressed as an appeal.

BROOKLYN, N. Y.

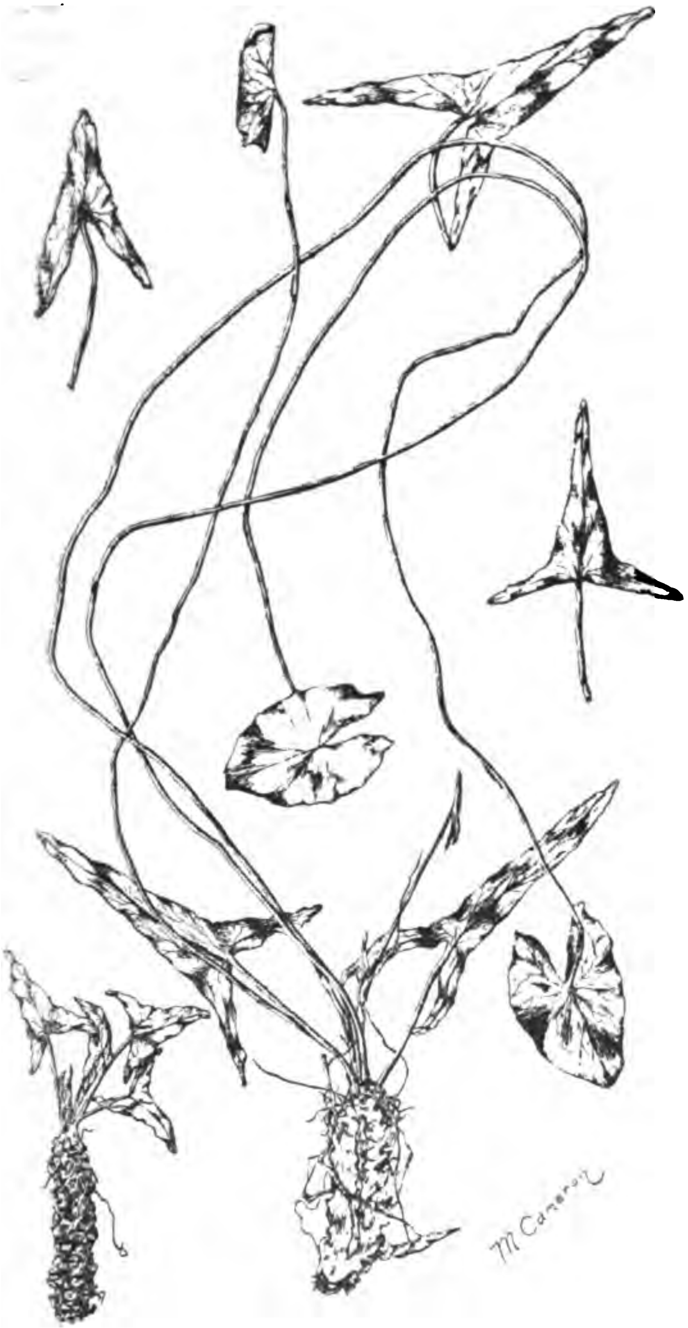
THE YELLOW WATER LILY OF FLORIDA.

By A. H. CURTISS.

AMONG all the plants of the United States, I doubt if one can be pointed out that presents more points of interest to a student of botany than does Florida's yellow water lily, *Nymphaea flava* Leitner (*Castalia flava* Greene). Though a conspicuous plant and one that must have been observed by white people for centuries, it was unknown to botanists until the publication of Audubon's Birds of North America. In one of the plates there was represented a *Nymphaea* with yellow flowers, and as Audubon was known to be too exact to paint a white flower yellow, Dr. Leitner went so far as to name it. Yet for many years afterwards botanists had no positive evidence of its existence.

In the year 1875, I was employed by the Department of Agriculture to collect Southern woods for the Centennial Exposition at Philadelphia, and in May found myself at Jacksonville, Florida. I came across the yellow water lily, made some specimens of it and sent them to Dr. George Vasey, the botanist of the Department. Dr. Vasey never wrote me anything about the specimens, and I do not know what became of them. Two years later more specimens were collected in or near the same locality by Mrs. Mary Treat, and I presume she sent them for identification to Professor Gray, to whom in those days nearly all who were interested in botany appealed for assistance, and never appealed in vain. At any rate the credit of discovering the species fell to Mrs. Mary Treat, who, as she writes me, made her "first studies of *Nymphaea flava* near Green Cove Springs in the winter of 1874 and '75." I do not know when she obtained flower specimens, but think it was in 1877 that she wrote up the subject for *Harper's Magazine*. Green Cove Springs is about thirty miles south of Jacksonville. The exact range of the species I do not know, but presume it has grown in most of the creeks emptying into St. John's river which are affected by the tides, and the latter are felt for a hundred miles from its mouth.

Strange as were the circumstances attending the introduction of this plant to the botanical world, I believe there is a stranger final chapter in its history yet to be written. It seems to me inevitable that this rare and beautiful species must soon become extinct, because the places where it



The Yellow Water Lily of Florida, showing the two forms of leaves.

grows are directly in the line of invasion of that Attila of the vegetable kingdom, the water hyacinth, (*Piaropus crassipes*). Through every creek in which the *Nymphaea* grows or has grown, and far above its stations, the tides carry ponderous masses of the hyacinths and all aquatic and littoral plants go down before it, even *Nuphar macrophylla,* which formerly dominated such waters, and the stoutest rushes, grasses and sedges. Other native aquatics have retreats which the hyacinth can hardly reach, but this slender *Nymphaea* grows just where the hyacinths are driven back and forth by tide and wind, or where they take complete possession of streams by their wonderfully rapid growth.

For several years I have supplied a certain nurseryman with roots of *Nymphaea flava,* several hundred each year. At first they were ordered in the fall, and I went for them with a boatman several times, and thus became well acquainted with the rather complicated root system of the plant, but never saw a vestige of fruit or of other leaves than the floating ones. Afterwards I merely sent the man, who brought me the roots washed and trimmed. It was not pleasant work, for the hoe or rake would bring up a mass of black ooze, from which the roots had to be extricated by hand. And we had to work rapidly while the tide was low. After the water hyacinth appeared it became difficult to find the *Nymphaea,* but fortunately my man found a fine bed of them in a little piece of water which was separated from the river by a marsh. This served as a source of supply for several years, but at last the hyacinths were borne in by an exceptionally high tide and took complete possession. So when the nurseryman sent me an order last winter I had to write him that I could not fill it, nor any future orders.

In 1897 I received an order for *Nymphaea* roots early in April, and presuming that it might be difficult to find the plants so early I went after them myself. I visited the locality which afforded the specimens, No. 4815 of my second distribution, and secured a fine lot of roots. To my astonishment I found that the plants were then provided with a second and very distinct set of leaves, thin, sagittate, short petioled and wholly submerged. I made some dried specimens of them and laid them aside, hoping to ascertain something further regarding the matter before bringing it to public notice. Receiving another order early in the following December, I sent my man to the same place and had him bring me some plants for examination. At first sight I thought they were putting forth the sagittate leaves in abundance, but they proved to be all of the common form, the circinate vernation giving the baby leaves a somewhat sagittate outline. Afterwards I examined plants of this species in other localities, in spring, summer and fall, but never found any sagittate leaves or indication of this existence. I might have come to doubt that I had even found such leaves had not the specimens been ready at hand in evidence of the fact.

So I decided recently to give up further study of the subject and to turn over my specimens to the National Herbarium. The accompanying illustration was made at Washington from these specimens, which may prove to be not only the first ever found, but the last. There seems to me to be something mysterious about these submerged leaves. Many aquatics have two sets of leaves, but I know of none in which one set is a rarity. The floating leaves of *Cabomba* would not be noticed by the common observer, but they are always present. The floating leaves of *Nuphar sagittaefolia* are apt to be torn off in summer by rapid currents and drift wood, leaving only the submerged, ulva-like leaves, but it can always be seen that the latter are not the only leaves. If the submerged leaves are of any utility they ought to be produced as regularly as the floating ones. Is there any other example of the occasional or periodical production of a set of leaves distinct and quite different from the ordinary foliage of a plant?

JACKSONVILLE, FLA.

HABITS OF THE DEEP-SET BULBS OF ERYTHRONIUM.

By GRACE STODDARD NILES.

IN that delightful chapter "Among the Wild-Flowers" in Mr. Burroughs' "Riverby" (pages 24–26, 1896), are several suggestive observations on the meaninglessness of the name *Erythronium*, as well as upon the habits of this lily's deep-set bulbs.

He writes: "It is a pity that this graceful and abundant flower has no good and appropriate *common* name. It is the earliest of the true lilies, and has all the grace and charm that belongs to this order of flowers.

"*Erythronium*, its botanical name, is not good, as it is derived from a Greek word that means red, while one species of our flower is yellow and the other is white.

"How it came to be called adder's tongue I do not know; probably from the spotted character of the leaf, which might suggest a snake, though it in no wise resembles a snake's tongue.

"A fawn is spotted, too, and 'fawn-lily' would be better than adder's-tongue. Still better is the name 'trout-lily,' which has recently been proposed for this plant. It blooms along trout streams, and its leaf is as mottled as a trout's back.

"The name 'dog's-tooth' may have been suggested by the shape and color of the bud, but how the 'violet' came to be added is a puzzle, as it has not one feature of the violet.

"It is only another illustration of the haphazard way in which our wild flowers, as well as our birds, have been named."

Mr. Burroughs' observations of the offshoots from the corms of dog's-tooth lily are valuable as a suggestive key, that should indeed lead the scientist or nature student, beyond the fact, to the true *cause* that nature has in giving this lily its unique power of planting its bulbous root deeper each year in the manner as observed.

In attemping to sever from the soil, the other day, one of the bulbs of this lily, I was surprised at its depths below the soil, and, indeed, fatigued before I really obtained the root entire.

The bulbs of lilies in general are near the top of the ground, yet Mr. Burroughs remarks, "Here is a lily with the bulb deep in the ground. How it gets there is well worth investigating. The botany says the bulb is deep in the ground, but offers no explanation." Now it is only the bulbs of the older or flowering plants that are deep in the ground. The bulbs of the young plants are near the top of the ground. The young plants have but one leaf, the older or flowering ones have two.

If examination be made of the one-leaved plants they will be found to "set upon the surface" of the soil "barely two inches below the earth, while the two-leaved plants bulbs lie buried often to a depth of eight inches."

Mr. Burroughs observes, "Of course they are started from the seed at the surface" of the mossy couch and "yearly sink deeper and deeper."

"The young botanist, or nature lover" will find "in late May or early June, after the leaves of the *Erythronium* have disappeared, that the ground or mossy beds where these plants stood "show curious-looking, twisting growths or *roots*, of a greenish white color." If they are examined they prove to be as smooth and large as an angle-worm and very brittle. Both ends will be found in the ground, one attached to the old bulb, the other boring or drilling downward and *enlarged* till it suggests the *new* bulb." Mr. Burroughs observes also that as yet, "he is not certain that this mother root in *all* cases comes to the surface." "Why it should come at all is a mystery, unless it be in some way to get more power for the downward thrust."

Mr. Burroughs thus made the pioneer observations tending toward a scientific truth; if not proving the *cause*, he shows us the effect of the cause, of "how the bulb of this dainty root pierces the hard soil, and so blunts itself, and forms, as Doderus writes, a "theball" or bulbous root shaped like a *canine's eye* tooth from whence "dog's-tooth" originated.

Let closer observations be made of our common plants and we shall soon find that the oaks will indeed talk, as of old, and the plants themselves will give forth the true causes and origins of their existence, and their names!

BRIEFER ARTICLES.

FRUIT WHICH ACT AS LEAVES.

Noticing the great bulk of the green surface of the fruiting racemes of the plants of peppergrass (*Lepidium apetalum*), it occurred to me to compare it with the leaf surface of the same plants. The little pods are flat, and nearly round in outline, with slightly convex sides. Each one exposes approximately six square millimetres of surface. An examination shows that the epidermis is abundantly provided with stomata, and that the parenchyma is composed of chlorophyll-bearing cells, quite like those in the leaves.

As is well known, this species of peppergrass drops its lower leaves early, and the lower part of the stem is often entirely naked. The remaining leaves, when there are any, are small, and vary from almost pinnatifid to nearly linear.

On a plant thirty centimetres high about one thousand pods were found. These were in the branching racemes on the central axis and ten lateral branches, the racemes taken together having an aggregate length of about one metre. The total green surface on the racemes was therefore about six thousand square millimetres.

By measuring a number of leaves and making careful counts and estimates, it was found that the leaf surface (counting both surfaces) on the plant was 6280 square millimetres.

It is to be noted that the racemes and fruits assume such positions as to bring one of the flat surfaces of the pods directly into the light. In other words, these structures are heliotropic, and act in this regard like leaves, and it can not be doubted that they function as leaves. Apparently this peppergrass dispenses with some of its leaves, and compels its pods to assume the leaf function. Later in the season the plants have still fewer leaves, and then photosynthesis must be carried on almost entirely by the green surface of the stem and the chlorophyll-bearing pods.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

THE FALL OF PORTO RICAN FORESTS.

More than half a century ago the Spanish planters of this island began clearing the interior districts for coffee and tobacco culture. There being no good roads and but little demand for the timber, the trees were burned where they fell; hundreds of thousands of dollars' worth of lumber and cabinet-woods were thus destroyed. Perhaps the old Dons did not realize the fact, but there was another reason for the burning: virgin tropical soil is very "sour" and the alkali of the ashes served to correct in part this dangerous acidity.

Long before the American occupancy all the conveniently arable ground on the island had been cleared. Public lands comprise about one-fifth of the entire area of the island. At present the only wooded districts are a few square miles about "El Yunque," the highest mountain (3800 feet) in the eastern part, and a few thousand acres in the west central part between Lares and Ciales; and these areas, although too hilly to be cultivated, are being robbed of their most valuable timbers. Indeed, if the Government does not at once establish and protect a forest reserve, there is great danger that many of Porto Rico's native trees may become extinct within a very few years.

The West Indian mahogany has already disappeared and the "Tabanuco," or candle-wood (*Dacryodes* [*Amyris*] *hexandra* Gr.), will not last two years at the present rate of cutting; the latter wood is stained and sold as mahogany. The native satin-wood is one of the most valuable cabinet-woods in the world's market, its transparent "grain" and lustre equaling, if not exceeding, that of the East Indian *Chloroxylon;* it is said to be worth $300 per thousand feet *wholesale;* only small trees are now procurable. While coffee is worth only six to ten cents per pound, the native will not spend much extra time in his "cafetal," when he can bring in wide but rough sawn planks of Spanish cedar which net him $25 per M. (and which net the dealer about $100 per M.). The beautiful purplish wood of the male cedar, as well as that of the Spanish cedar, is extremely scarce; and the strangely grainless red "Ansubo" (*Sideroxylon mastichodendron*, Jacq.) and the dark mauve, never-decaying "Ortegon" (*Coccoloba* sp.) are rapidly disappearing.

There seems to be small hope of re-afforestation of the island, either on the part of owners of large mountain estates or directly by the Insular Government. Land once cleared, subjugated, in an over-populated country is not likely to ever regain its splendid freedom.

And so, while vast areas in Trinidad and Jamaica retain almost intact their virgin naturalness, the hills of Porto Rico seem doomed to stand bare-headed and face the terrible tropical rains which will soon strip them of their rich humus robes and leave them unsightly monuments to human greed and shortsightedness.

Otis W. Barrett.

THE LIGHTEST OF WOODS.

Deep in the bogs and swamps of southeastern Missouri, in Dunklin and Butler counties, where the land is never dry, and water from one to six feet deep stands perpetually in the forests, there grows a rare and curious tree. The natives know it as the corkwood, or cork tree.

Science has given it a longer name, the *Leitneria Floridana*, because it was first discovered in Florida, along the coast from which it has long since been washed away. Some meagre specimens of it, two to six feet high, are still found in the swamp near Apalachicola, Fla., and a few near Varner, Ark., but in both these places it is exceedingly limited in numbers, an occasional specimen being found and hardly rises to the dignity of a tree.

Only in southeast Missouri, where it reaches a height of 15 to 20 feet and a diameter of two to five inches, is it really a tree. What makes corkwood so remarkable is its exceeding lightness. Beyond a doubt it is, as Mr. Wm. Trelease, of the Missouri Botanical Garden, has shown, the lightest tree in weight that grows.

Its wood weighs less than cork. It is so light that the natives use it to make floats for their fishing nets. And yet its wood, though so spongy one may easily sink one's finger in it, is far tougher than cork.

The specific gravity of corkwood, as learned from careful tests made by Professor Nipher in St. Louis, is .207. The roots are even lighter than the stem; a test showed them to have the astonishingly low specific gravity of .151.

A further idea of the lightness of the corkwood may be gained by a comparison with other woods. The great majority of woods range between .400 and .800. Cork itself is .240. The tree that approaches closest to the corkwood in lightness is the golden fir tree, which grows in the swamps around Tampa Bay and along the Indian River, Florida.

Its specific gravity, according to Sargent, is .2616. In comparison with the corkwood, which is the lightest wood with its specific gravity of .207, may be placed the heaviest wood known, the black ironwood of Florida, whose specific gravity is 1.302.—*American Gardening.*

SUBTERRANEAN PLANTS OF EPIPHEGUS.

Having need of *Epiphegus Virginiana* in late October, 1900, I sought a piece of beech woods in Holbrook, Massachussets, where I found the plant growing abundantly in rich, deep humus. It was past the flowering time of this species in the main, but the warm season that year was unusually protracted, and numerous short shoots were being produced from the swollen stem bases, upon which I found flowers and fruit in all stages of development. The flowers borne by these late branches are very small. They are all cleistogamous, and invariably give rise to capsules filled with fertile seed.

Occasionally these secondary shoots were observed to be flowering somewhat below the surface of the ground. This fact led to further exploration, and on turning up the mold I found many shoots that for one reason or another had never escaped from the soil. They were as productive of fruit and seed as the aerial branches. Finally I brought to light a number of whole plants that had come to maturity below the surface. They were buried one or two inches deep, and were dwarf specimens an inch or less in height. They bore several fruits containing good seed.

Whether this variation is simply physiological and due to tardy germination or lack of nourishment, as seems probable, or is constitutional and inheritable, the case offers an interesting example of a phanerogam leading its existence, and indeed completing its entire cycle of life, underground.

R. G. Leavitt, in *The Botanical Gazette.*

THE WILD FLOWER PRESERVATION SOCIETY.

SECRETARY'S REPORT.

The total enrollment to July 1, is as follows: Fellows 2, Members 107. These figures represent only paid members, there being many pledges outstanding. The Society has attempted no extensive work as yet, other than the free distribution of essays and circulars to those applying for them, and to a selected list of persons in the more prominent cities. It is the intention of the Secretary, during the late summer and early fall to deliver a number of illustrated lectures on "Vanishing Wild Flowers" in localities that seem to promise support of the movement. Attention is directed, in this connection, to the rules governing the formation of local chapters and the need of prompt organization of many such. No Society of national scope can work without funds, and to get funds we must have members, not singly or by tens, but by the hundreds if possible. At the recent meeting of the Board, discussed below, it was suggested as one of our fields of work that the railroads should be induced to place land immediately around their tracks under the guardianship of the Society, which could in this way save the flora of many a wild bog through which the road passes, and which is now sacrificed to the axe and the scythe. A large fund for printing is also needed, for use in preparing leaflets to be distributed in the schools.

Attention is called to a misprint in our circulars of information. The fee for patrons of the Society is one hundred and not fifty dollars as there appears. C. L. P.

THE PITTSBURG MEETING OF THE SOCIETY.

A most enthusiastic public meeting under the auspices of the Society was held in the Botanical Hall of Phipps Conservatory, on the afternoon of July 2. Short and stirring addresses were made by Mrs. N. L. Britton, Prof. Chas. E. Bessey and Prof. S. M. Tracy. In the absence of other officers, Mr. Charles L. Pollard, the Secretary, was in the chair, and opened the meeting with a short address describing its organization and aims. Mrs. Britton pointed out various lines of activity, and Dr. Bessey gave a practical illustration of the harm done by tourists in Cheyenne Cañon, Colorado, a spot reached by trolley, and hence being rapidly devasted of its floral beauties. Prof. Tracy outlined a plan he had devised for securing the coöperation of the railroads.

Previous to this, the Board of Managers held a meeting and disposed of a number of routine matters. It was decided to invest all sums received from those enrolling as Fellows or Patrons in a permanent fund, to be known as the Life Membership Fund, and to use only the income of these sums during the lifetime of the members. The Misses Caroline and Olivia Phelps-Stokes, were elected honorary Vice-Presidents of the Society.

NOTES.

The name of Mr. A. M. Read, of Washington, D. C., was accidentally omitted from the list of managers printed in the April issue of THE PLANT WORLD.

Who will be the first one to organize a local chapter in his neighborhood? As yet none have been formed, and in the future it will be an honor to have the privilege of standing first on our list.

New York City has furnished two Fellows for the Society. When shall we have the privilege of enrolling a Patron?

The full membership list will be printed in connection with the annual report of the Board, toward the close of the current year.

One of our members recently found a plant of a rare lily, *Lilium Caroliniauum*, in the woods near his home. It grew in a rather precarious situation, and instead of plucking the stalk he lifted the entire plant, bulb and all, and transplanted it to a congenial situation on his own estate, where it is apparently thriving. This is a course that can be followed to advantage in many instances where to leave a variety in its original habitat would be to invite certain destruction.

In this issue appears the last of the three prize essays in the Stokes' Fund competition of the New York Botanical Garden. Through the courtesy of the latter a number of the essays in the competition unsuccessful have been turned over to the Society, and such as are deemed suitable will be published from time to time in THE PLANT WORLD, either as a whole or in part.

GENERAL ITEMS.

The meeting of the American Association for the Advancement of Science in Pittsburgh was a most interesting one, although the attendance was scarcely up to the average. About fifty amateur and professional botanists were registered at the Botanical Club. The hall in which sessions of the latter were held was decorated each day with large bunches of choice flowers from the Phipps Conservatory, the display of Japanese iris and gloxinias being remarkably fine. The pleasant entertainments and hospitality extended by the local committee was greatly appreciated by the visiting scientists.

Some tulips in my garden exhibited a rather peculiar freak a year ago last spring. As is well known, this plant renews its bulbs at the close of the blossoming season, so that when the foliage is ripe and the bulbs are lifted, two or three may be found within the skin of the old one. Upon digging up my plants I found one stem with not only the normal bulbs at the base, but with two supernumerary smaller bulbs attached to the stem at intervals of several inches. These were perfectly developed, and grew well when replanted the following season.

C. L. P.

One of the most interesting features of the Phipps Conservatory in Pittsburg, Pa., is double cocoanut palm or coco-de-mer, known to science as *Lodoicea Seychellarum.* It is confined to the Seychelles islands, and is very rare in cultivation or in herbaria; the specimens at the Phipps Conservatory were grown from seed, and required over a year and a half, in a temperature of 90°, to germinate. One plant has been givin to the National Botanical Garden, and another to the New York Botanical Garden.

The development of the witch hazel (*Hamamelis*) has been made the subject of an interesting study by D. N. Shoemaker (Johns Hopkins University Circulars, No. 158, p. 86). He shows that the pollen, as might be expected from the plant's habit of blooming in the fall, is very resistant to low temperatures. "Pollen taken from buds which opened in January after a week of cold weather with the mercury as low as —15° F., sprouted quite normal though short tubes." The pollen on first sprouting on the stigma grows with comparative rapidity until the beginning of winter, when the upper part of the carpel dies and the pollen tube passes the winter in the part of the carpel which is covered with hairs. On the opening of spring the pollen tube continues its growth and fertilization takes place about the middle of May, or from five to seven months after pollination.

NOTES OF CURRENT LITERATURE.

IN 1895, Dr. C. E. Waters, of Johns Hopkins University, published an interesting and valuable key to the ferns of the Northeastern United States based on a study of the stipes. It was designed solely as an aid in identifying the ferns when they can not be obtained in fruit. The author considers that his first paper was faulty in that it did not take into account any but average sized specimens of the various species treated. Dr. Waters has now prepared a careful revision of this key (John Hopkins University Circulars, No. 158, June 1902, pp. 83–85), in which very large as well as very small-sized specimens of each species were studied. The result is a very satisfactory key to our ferns, and one that must prove of great value in placing the species when only sterile specimens can be obtained. The primary divisions are based on the number of bundles observed in a cross-section of the stipe, and the secondary divisions on the shape and disposition of the bundles. Numerous cross references make it possible to place large or small specimens of a species, as well as the normal examples. Copies of the paper may be obtained of the author for fifteen cents.

IT has been recognized for some time that various fungicides, especially such as contain copper, prove injurious in greater or less degree to the foliage of fruit trees and other plants. Mr. S. M. Bain, of the University of Tennessee, has conducted an extended series of experiments on the *Action of copper on leaves* (Bull. Agric. Exp. Station, Univ. Tenn., Vol. XV. No. 2, pp. 19–108, Vols. I–VIII), with special reference to the injurious effects of fungicides on peach foliage. He finds that as peach leaves have a thin cuticle they have the property of absorbing the copper solutions and thus inducing injury to the growing cells. Lime neutralizes or at least retards this injurious action.

THE Bureau of Plant Industry in the U. S. Department of Agriculture has recently issued a number of bulletins, as follows: The North American Species of Spartina, by E. D. Merrill [No. 9]; Records of Seed Distribution, and Coöperative Experiments with Grasses and Forage Plants, by F. Lamson-Scribner [No. 10]; Johnson Grass, by C. R. Ball [No. 11]; Experiments in Range Improvement in Central Texas, by H. L. Bently [No. 13]; Forage Conditions on the Northern Border of the Great Basin, by David Griffiths [No. 15]. Copies of these bulletins may be purchased of the Superintendent of Documents, Union Building, Washington, D. C.

EDITORIAL.

The absence of the Supplement from our May issue was caused by a troublesome delay in securing the two half-tones illustrating the Asclepiadaceae and Convolvulaceae, and it was deemed advisable not to postpone publication longer. As the supplement is to be concluded in the December issue, it may be necessary from time to time to increase or diminish the installments so that its termination may coincide with that of the volume. While we have not as yet definitely determined with what to replace the present Supplement, it is probable that for the forthcoming year we will simply devote this additional space to the journal itself, thus affording abundant opportunity for the publication of general articles in addition to the matter furnished by the Wild Flower Preservation Society of America.

We shall have two hundred copies of the Supplement neatly bound in pamphlet form, with full index, and shall offer them at a purely nominal price. It is the intention of the author, Mr. Pollard, soon to prepare a new and revised edition adapted for use as a general text book, and containing a glossary of technical terms; this we expect to publish, upon its completion, as the first of a series of "Twentieth Century Text Books" on botanical subjects.

"Newspaper Science" is still rampant. A recent issue of a Washington newspaper contained an article, over a column in length, purporting to describe the so-called "Kissing Palm," lately received by the Department of Agriculture. The ingenious writer even published a technical name for this wonderful plant, "Palmetto osculari," and had the impudence to discuss its properties, as if they were actually possible. The gist of the story is that every one who comes within the sphere of the palm's influence,—presumably within a few yards or feet,—becomes afflicted with a violent desire to embrace and kiss everyone of the opposite sex standing near! There can be no words of condemnation too strong for an otherwise reputable newspaper that will publish trash of this sort. The folk lore of plants contains many bits of legend or myth, and their narration, within reasonable bounds, is of interest to every one; but any attempt to misrepresent fiction as fact cannot fail to have a mischievous effect.

BOOK REVIEW.

LABORATORY MANUAL IN ELEMENTARY BIOLOGY. By *Frederick De Forest Heald.* Binghamton, N. Y., W. N. Clute & Co. 1902.

With the advent of the so-called laboratory method of instruction in biology, came a host of laboratory manuals. Indeed, so thick and fast have they come, that it would appear that pretty nearly every laboratory instructor has felt called upon to write a book, setting forth his individual methods of instruction. The result has been the production of some few books that are decidedly good, with a considerable number that are more or less decidedly poor. As the author of the little book before us states in his preface, all these manuals may be roughly divided into two classes,—those in which the student is simply required to verify facts, and those in which the "question method" is carried to the extreme In the first of these the power of independent observation, the essentials of thorough instruction is left dormant, while in the latter method the student is likely to be left in a haze of questions, none of which he can answer.

Professor Heald, believing that the means of successful teaching lies between these extremes, has given us a book in which there is a judicious combination of both. The student is confronted by numerous questions regarding the material in hand, but he is also given some idea of what he is looking for. In the hands of a competent instructor, and without this no book known will be a success, this manual can hardly fail to find an acceptable place.

In this book the experiment is again tried of presenting the subject without illustrations. In this respect there are two classes of manuals, one more or less copiously illustrated and the other without any. It would seem that there should be a middle ground in this also. It more than ever emphasizes the necessity of a competant instructor.

F. H. K.

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THROUGH DESERT AND MOUNTAIN IN SOUTHERN CALIFORNIA.

By S. B. Parish.

IT was already afternoon when the friend who was to accompany me arrived. I had not expected him until the following morning, but we determined to start at once, since we wished to see as much of the country as his limited time would permit. Everyone bustled about to hasten the final preparations, so that a few hours of daylight yet remained when we drove away. The road lay across the sloping mesa to the Cajon, the pass through which the Santa Fé Railroad enters the San Bernadine Valley from the Mojave Desert.

Rough shrubs thickly clothe this mesa, a plant-covering very prevalent on the plains and hills of southern California. Here the most abundant species was the Chemiso (*Adenostoma fasciculatum*), with which were mingled the holly plum (*Prunus ilicifolia*), and the bushy pentstemon (*P. antirrhinoides*), still displaying a few of its lemon-yellow flowers. Impenetrable masses of *Opuntia* were covered with lurid red or yellow blossoms. Fairest of all the stately *Yucca* scapes (*Y. Whipplei*), ten or fifteen feet high, bore aloft their immense spikes, loaded with hundreds of waxy bells, pure white or purple-tinted, and in scores lit up the darkening landscape. The annuals, which are wont to carpet the intervals in variegated pattern, had withered, or remained only in vestiges, for it was the 29th of May, and the winter had been one of unusual and protracted drought.

Perennial herbs are not adapted to these dry plains, and few of them are included in their vegetation. But the two loveliest of these few were now in their prime, a *Calochortus* (*C. Plummerae*), with cups of richest purple, and the brilliant scarlet larkspur (*Delphinium cardinale*). We passed a party of girls returning to the town with large bunches of these splendid blossoms.

The sun was low as we entered the pass, and rain drops began to fall. Welcome as rain is in this dry climate, we felt that a wet night would be a little out of place to campers unprovided with a tent. So we were glad to drive into the big barn at Glen Helen, fifteen miles from home. Supper was soon eaten, and spreading our blankets on the hay, we congratulated ourselves that we, and our horses, and all our belongings, were safely under shelter.

The morning showed that the rain had been very light, just enough to lay the dust and freshen the air, and make traveling delightful. We were off early, ascending at an easy grade the open valley, which after some miles narrows into the "box cañon," from which the pass gets its name. Here the road is scraped out from the scanty talus of the cliffs, which part only far enough for the passage of a stream, a mere trickle now, but sometimes rising in flood and tearing out the laboriously constructed causeway.

One would expect a pass like this to be a good collecting ground, but I have always found this one a disappointment. Its only very good plant is *Allium fimbriatum*, which has not yet been discovered elsewhere. We got a few specimens, and on the same hillside an abundance of fine *Malacothrix Clevelandii*, with a few other things worth putting in the press.

After passing through the Narrows, we left the main road and took a by-way, which would conduct us to the point where the Mojave River makes its exit from the mountains. This road was in the very bed of a cañon, now rocks, now sand, and for a long way only wide enough for the passage of the wagon. It was absolutely void of any botanical interest, so we were glad to reach its head, although the steepness of the grade by which we must leave it was appalling. The horses, however, were equal to the effort, and reaching the summit, at an altitude of 3,500 feet, we found ourselves at the head of a wide flat valley, which sloped very gradually to the river. We were in another botanical region. The ever-present shrubbery still covered the country, but its composition was different. The desert peach (*Prunus fasciculata*) was abundant, but it was evidently a bad peach season, for but few of the little fuzzy fruits were to be seen. *Aplopappus monactis*, *Audibertia incana*, and the southern variety of *Purshia tridentata* were in blossom. Stops were frequent, as we sprang out to gather some interesting plant. Noticeable among these were *Zygadenus paniculatus*, now first collected so far west, the rare *Lemmonia*, *Hosackia sericea*, *Delphinium Andersoni* and *Asclepias vestita Mohavensis*.

Quite as interesting it was to note the denizens from the other side of the range mingled with this new flora. Not a single shrub, I think, a couple of herbs (*Lathyrns lætiflorus* and *Lupinus formosus*), but a larger number of little annuals,* which seem better able to adapt themselves to varied conditions than are plants of longer duration.

Horsethief Creek was soon reached, and in the damp sand wherein its thin stream was almost lost, fine typical specimens of *Phacelia Mohavensis* were growing. The dry flats nearby were brilliant with the golden cups of the perennial California poppy; but the annual species (*Eschscholtzia peninsularis*), so very abundant on the other side of the mountains, does not appear to cross over.

It was now but a little way to the Mojave River, and shortly after three o'clock we were glad to end our long day's drive, and camp by its clear, rapid stream, which has at this point a considerable volume. Dinner over, there yet remained time for a stroll up the broad bed of sand, dry and boulder-strewn, which borders it. This sterile soil supported some elegant annuals, which, like so many plants thus conditioned, showed more flowers than leaves. There were *Gilia dichotoma*, just furling its large white petals for the night, and revealing their delicately tinted backs; a brilliant scarlet *Mimulus*, which I did not identify; *Monardella candicans*, emitting its aromatic fragrance beneath the foot; and *Abronia pogonantha*, loaded with its long-stemmed clusters of fragrant lilac. The cañon invited at least a day's exploration, but the approaching darkness compelled a reluctant return to camp.

The next morning we were up at the first faint streaks of dawn, and were traveling down the Mojave River, following a little-used road, so dim that at times we quite lost it. Every step was taking us further into the desert, and among strange and interesting plants. Again there was a change in the shrubs. The handsomest of these new ones was *Salazaria*, covered by the abundance of its inflated purple-tinted calyces, to which the corolla seems a mere blue tip. Others prominent by their abundance were two *Tetradymias* (*T. spinosa* and *T. canescens*), and two *Lyciums* (*L. Cooperi* and *L. Wrightii*). All were in fruit, or past it, and were beginning to shed their leaves for the summer, for most of the desert shrubs, and all its few herbaceous perennials are dormant through the heat and drought of summer; just as in northern cli-

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*The following species were collected: *Arenaria Douglasii*, *Œnothera strigosa*, *Godetia quadrivulnera*, *Gilia aurea*, *Baeria graciles*, *Pentachaeta aurea* and *Lagophylla ramosissima*.

mates plants are dormant in winter to escape the cold. *Ephedra Nevadensis* was abundant, as were *Opuntia echinocarpa*, and the unarmed *O. ramosissima.* So was an *Amsonia*, its flowers faintly tinged with blue (*A. breviflora*), and there yet lingered a few of the brilliant red *Calochortus* (*C. Weedii*), but we were too late to see this in its full beauty. In one place we passed through a fine plantation of *Lupinus brevicaulis*, and an occasional specimen of the rare *Lomatium Mohavense* was yet to be seen.

We were now in the *Yucca* belt, a region thinly covered with the grotesque trees of a single species (*Y. brevifolia*), locally known as the "Tree Yucca." They attain a height seldom exceeding thirty feet, and shoot out a few angular branches, clothed at the ends with a sheaf of short, dagger-like leaves, of an olive-green color, which harmonize well with the prevailing grayness of the landscape.

Noon found us at the Hesperia crossing of the Mojave. Miles back the water had sunk away in the wide bed of sand that indicates the river's course. But on its further bank the county maintains a well for the use of travelers, and here we stopped to lunch under the scanty shade of a yucca clump before undertaking the waterless twenty miles that lay before us. The sand dunes about us were partly held by the half-buried tufts of a *Poa* (*P. Uroillianum*), which grows only in such places. Early in the season some choice annuals inhabit this barren strand, and we were fortunate enough to find a single specimen of the rare *Collinsia Davidsonii* still remaining.

Leaving the sand dunes the road entered a long ravine, whose sides were decked with the great lilac-colored flowers of the desert aster (*A. tortifolius*) and the yellow marigold-blossoms of *Dysodia Cooperi*, a plant whose odor justifies its generic name. *Oxytheca perfoliata* spread its radiate circle of red, and a few other less conspicuous plants were seen. These plants accompanied us throughout the afternoon, during which the only novelty encountered was a fine patch of the recently described *Plantago picta.*

Late in the afternoon we sighted the point of rocks that marks the situation of Rabbit Springs, our destination for the night, and at the same time perceived that we had missed the fork of the road which would have led us to it. There was nothing to do but to strike across the country, winding, as best we could, among the cactuses and other almost equally horrid shrubs. At length we came out on a dry lake, smooth and level as a race track, and as bare, except for the fringe of nitrophilous vegetation which surrounded it. The Mojave desert is not a vast sandy plain, as one is apt to imagine a desert to be. It is cut up into valleys by short ranges of mountains. What rainfall it has is violent, and it immediately runs off from the steep, bare mountains, and settling in the lowest part of the intervening basins, forms shallow ponds often of considerable area, but seldom more than a few inches deep. The water speedily evaporates or is absorbed, and its bed remains a level, either of hard clay, or looser material, according to the nature of the soil.

At the lake the right road was regained, and crossing a low divide the cotton woods at Rabbit Springs were in sight, a cheerful fleck of green in the burnt landscape. This little oasis is a favorite place with me, so many good plants are to be had about it. It is the type-station for a number, some of which have not as yet been found elsewhere. An old Scotchman has lived here for many years, and stepped out from his weatherbeaten cabin to welcome us to his domain. I think he must pass much of his abundant leisure shaving, for he never fails to appear fresh from the razor.

Here is a long knoll from which spring some slender trickles of water, sustaining a few acres of salt grass (*Distichlis*), almost thick enough to conceal the efflorescing alkali about their roots. Among the grass grows three species of *Cleomella*, a thistle (*Cnicus Mohavensis*), a *Calochortus* (*C. striatus*), a *Sidalcea* (*S. nitrophila*) and several rare species of *Atriplex*. The surrounding mesas and mountains, barren as they appear, here never failed to reward exploration.

The next morning the driers must be changed, that irksome but necessary task which consumes so much valuable time on a collecting trip. The rest of the morning was spent in a walk to a neighboring mountain spur, where several good plants were secured, the most interesting being a fine new *Nemacladus*, for which I have proposed the name *N. adenophorus*, in reference to the curious and beautiful glands of the capsule.

We got a late start after dinner; the nature of the road restricted us to a walk, and several stops had to be made for roadside plants, so that it was nearly dark by the time we had accomplished the nine long miles to Carbenberry Springs. These are situated at an altitude of 4000 feet in the mouth of a cañon entering the San Bernardine Mountains.

An early scramble over the rough hills, at the peep of day the next morning, was disappointing. The dried remains of early annuals were abundant, but of these only the lovely *Phacelia campanulata* still lingered in blossom, and there were some unusually fine clumps of *Mirabilis aspera*. But about the springs, its type locality, the desert rose (*R. Mohavensis*) was in fine condition, growing in company with one of Nuttall's willows (*Salix exigua*).

This early ramble gave a brisk appetite for breakfast, which despatched, the ascent of the mountain was begun. There is a good road, which follows for a long way the rocky channel of a winter torrent, now entirely dry. Frequent were the stops, as new plants appeared on the precipitous banks. First a large *Erigeron*, with light pinkish flowers; then the pretty *Eriogonum vimineum*, a white flowered form, quite as common as the darker one, which suggested the specific name. A rocky talus supported an abundant growth of *Eschscholtzia minutiflora*, and afforded a few specimens of the curious *Mohavea*. Next appeared the bright scarlet spikes of *Pentstemon Eatoni*, one of the handsomest members of a handsome race. Here and there great rounded clumps of *Cereus Mohavensis* cling to crevices in the rocky walls. It was past the flowering season of them, but *Fremontia* was still profuse with golden blossoms.

This is known as the Piñon belt, where the scraggy dwarf pine (*P. monophylla*, which gives it its name) thrives without soil or moisture, if only it can find a crevice by which to thrust its roots into the scorched and barren rocks. *Ephedra viridis* was the most noticable of the undershrubs, a species easily recognized by its compact growth and slender bright green stems. At the head of the cañon a stony slope is the type station of *Brickellia Mohavensis*, which was in good flower.

The road now began to climb the mountain side by a winding grade, affording a wide outlook over the desert. All was bare and brown, save for the tiny green dot of the distant Rabbit Springs. The prospect was desolate, but the desert thus viewed has about it something mysterious and indefinably alluring.

As we approached the summit the stony slopes were brightened by the flower-laden mosses of a pink phlox (*P. austromontana*). The summit is over 7,000 feet above sea level, an ascent of 3,000 feet from our morning's camp. As soon as we had passed it we found ourselves in a little mining camp. On the hillside a stamp-mill was noisily busy, and near it clustered the wooden houses of the "camp." A stream of yellow "tailings" crept muddily down the valley.

Events were evidently few in the camp, and the negotiations connected with the purchase of a sack of barley for the horses, eventually involved all the business men and women of the place, and even aroused a languid interest in the row of apathetic miners, sunning themseves on the porch of the principal emporium.

Bear Valley, long and narrow, lay before us; on either side a ridge of rough, pine-clad mountains, reaching long, sloping arms into the central meadows. The forests are not dense and gloomy, as in moister climes, but open and park-like, and full of light. One can drive anywhere through them if the ground is not too rough.

We intended to go down the mountain by a road which had recently been made along the Santa Anna River, but we now learned that the side of a mountain had slipped down and obliterated a mile of it. It was a disappointment to give it up, for when a new road is made, I am never quite content until I have been over it. But the old road was an agreeable one, even if lacking the charm of novelty. It led us along the borders of the meadows, and under the shadow of the great pines, where sheets of the purple flowers of a dwarf *Phacelia* (*P. Davidsonii*), stained the ground as delicately as sun beams through tinted glass. The rounded clumps of the snow bush (*Ceanothus cordulatus*) were in full bloom, and the bearberries wore as white a robe.

An early camp was made at the foot of the valley, which here narrows to a rocky gorge. It was at the head of a meadow, all golden with large buttercups and native dandelions, and here and there thick set with white blossoms of the meadow Lewisia (*L. brachycalyx*), or of the almost equally fine *Hesperochiron*. An abundant little *Mimulus* glowed in crimson splashes; only blue was wanting, and that was added at the edges by the beautiful *Lupinus Grayi*. It was hard to turn from all this beauty to the prosaic task of caring for the specimens which crowded our presses; but that done, there yet remained time to add to their number. Among the best of our acquisitions here were *Sidalcea pedata*, *Potentilla Wheeleri* and *Nemophila sepulta.*

Wood had been very scarce at our other camps, but here it was abundant, and as night came on we heaped the fire with great logs, and lay watching the flames throwing their sparks aloft, and casting strange shadows among the pines; while on the farther side the horses stretched their tethers to get within the circle of light and heat.

In the morning we followed up the stream on whose bank we had camped. Now the encroaching hills scarcely left room by its side for the road, and again widening out, they afforded space for little verdant meadows. At last in one of these we reached its source, and climbing the final ridge we were at the summit, at an altitude of 8,000 feet. Here, on those days when the fogs do not hide it, one can catch the far-off glitter of the Pacific, and see, or fancy that he sees, the islands of Santa Catalina and San Clemente. We were not so fortunate, for the horizon was bounded by a bank of fog.

The road now wound through the mountains, with a gradual descent, which made rapid traveling exhilarating to both men and horses. Now we skirted a rugged gorge, which seemed rent to the heart of the mountains, and now splashed through a clear stream; and once, in a shaded ravine, we crossed a great drift of snow, yet lingering from the winter storms. A noble forest, untouched by man, covered the declivities. The most abundant trees was the yellow pine (*Pinus ponderosa*), and through it were intermixed a few black pines (*P. Jeffreyi*), and lofty sugar pines with white firs (*Abies concolor*) and post cedars. The ridges sustained a growth of big cone pines (*P. Coulteri*). The only deciduous tree of note was Kellogg's oak, and it was interesting to observe, as we descended, its gradual development in size and advancement, from the shrub at the summit, whose red leaves were just bursting from the bud, to the spreading tree of lower altitude, full-robed in green. We seemed early for flowers, for none were seen that we cared to put in the press, until the noon halt was reached. This we planned to make at a certain little "flat," encircled by majestic trees, where an ice-cold spring watered a tiny meadow, with banks of mosses and thick-standing ranks of "Indian corn" (*Veratrum*). But we found the sylvan meadow trampled to dust, and occupied by the rude cabins of woodmen, and all its noble trees felled to the ground. A vicious little lumbering railway twisted everywhere, and the whole country side was covered with the wreckage of the forest. It was pleasant to know that most of the forest through which we had passed is protected from a like destruction by the beneficent reservation laws.

So we drove on, and ate our lunch amid more prosaic surroundings, under a clump of oaks overlooking the sawmill. A few flowers attracted our attention, the most interesting being the mountain iris (*I. Hartwegi* var.), which, unlike most of its family, is content to grow in dry soil.

We were now at the rim of the range, which breaks with the greatest abruptness to the valley below, all checkered with orchards and green fields, while the road could be traced winding in mazy convolutions down the mountain's flank. The horses were eager for home, which by a mysterious instinct, they knew was near, and dashed merrily down the curving path.

The flora was too familiar to invite stoppages, but we interested ourselves in noting the changes of vegetation as we descended. The pines hardly passed the summit, and the oaks, which now reached their best development, soon after disappeared. They gave place to a chapparal, in which *Ceanothus* and Manzanitas abounded. Then came a narrow belt of dwarf pines (*P. tuberculata*), none of them over fifteen feet high, but all, even those no higher than three feet, bearing cones. These are produced in verticels about the main stem, a new circlet each year, and as they almost never open or drop off, an old tree is well burdened. Below this the Chemiso (*Adenostoma*) is the prevailing shrub, while the very lowes tslopes are covered with the white and black sages (*Audibertia*), famous for yielding the most limpid and aromatic honey.

And now, having descended 4,000 feet in the last two hours, we round the last shoulder of the mountain, and at once find ourselves in the orange groves of San Bernandine valley.

THE PROTECTION OF NATIVE PLANTS.*

By Idelette Carpenter.

MATTHEW ARNOLD somewhere has said, "Salvation comes not by the might of the unenlightened many, but through the influence of the enlightened few." All great reforms have been brought about by the earnest, determined work of a few, who have so preached and lived their peculiar doctrine that scoffers have been forced to accept and believe.

In our country John Burroughs has been the great sower of the seed of the love of Nature. No one has done so much as he to show us the glory of the earth. "The Winter Sunshine," the nests with their tragedies, the first spring day, the roily river, the running sap, emerald fields and golden dandeloins, all are texts from which he has preached his sermons. The seer of Slabsides has been the source of inspiration for the Nature study of the present time; great institutions like Cornell University have put the work in a practical form, so that there is no school house in the state, no matter how plain and unpretentious, but has its sunny window filled with sprouting seeds and growing plants; its shelf with pebbles from the brook, and rocks from the nearby hill; a hang bird's nest, and the hornet's home.

The seed has been sown; it has taken root, the stems are already stretching skyward, and it is for us to see that the tender sprout becomes a strong and vigorous tree, bearing as its fruit the intelligent care of all living things.

In the preservation of the native trees, shrubs and herbs of our State every school should become the educational center. The trees of the immediate vicinity should be identified, those near the school house and in the village should be labeled (to be able to call things by their names is always of interest to children); the elm tree beetle, the maple and fruit tree borers, the web moth, and other destructive insects, with their remedies, should be studied.

The fragrant spicebush, witchhazel, alder, andromeda, laurel and dog-wood might vie with the old world forsythia, syringa and privet in the school yards.

What country boy and girl does not know where to find the first violets, where to look for the first arbutus, the spotted adder's tongue, the early saxifrage? Have you never heard the secrets of country children—some wonderful patch of violets which no one else knows about, some far away strawberry field ripening in the sun? The teacher never has to create an interest in the spring flowers. Here is where the restraining influence should come. Make the children feel that the flower is a living thing, that its life is as valuable and important as the life of an animal, and that it is wrong to cut this life short. Great bunches, whole armsful of flowers, are not what we want. With little children make them feel that the plant asks "Not to be taken from its brothers and sisters;" "Please leave me in my home."

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*Published by courtesy of the New York Botanical Garden.

A border along the school house fence which will show what cultivation will do for the wild flowers would be an excellent object lesson. Blue flags and brooklime for the wet corners, Oswego tea, Turk's cap, fireweed, the evening primrose, *Orchis spectabilis*, the moccasin flower, all could be used. By placing them on the level with the rose, the pansy, the geranium, a certain respect for the native plants would thus be fostered.

State agricultural reports, forestry reports, literature relating to the care of plants, and plant relations should be in every school library.

What part have city children in this work? In the large cities the smaller children get their only glimpses of the "Great Green Book of Nature" in the school-room: yet here the lesson of regard for plant life can be instilled. "The bark of the tree is its coat; it protects the tree, and keeps it warm; we must not cut it and hack it." "From flowers come the seed, we must not destroy the flowers or soon there will be no plants."

In Greater New York there are fifteen thousand boys and girls in the various high and training Schools. What an army of educational workers to interest in the protection of plants! As their eyes are opened to the wonders and beauties of the plant and animal world in their study of biology, their respect for all living things is increased.

By what practical means may we reach this great army of children, and get them to work for the protection of our wild plants? Circulars might be sent to each school in the State asking that in the Nature study, and on Arbor Day, attention be called to the destruction of the native plants, and that the teachers be asked to use their influence to create a sentiment against such vandalism. Rewards might be given to the schools throughout the State which would have the greatest number of trees correctly named, and others for the best collection of native shrubs and plants in the school yard; finally, signs requesting people not to break shrubs or pick flowers to such an extent as to injure, could be placed in resorts near large cities.

PLANTS USED FOR CUBAN CONFECTIONERY.

By Charles Louis Pollard.

DURING a recent trip to Cuba Dr. Edward Palmer made an examination of the various forms of confectionery commonly sold on the streets and in the markets, in so far as it was manufactured from native fruits. He brought with him samples of many different kinds, and on his invitation a committee of local botanists in Washington met one day for the purpose of testing and passing opinion on the various dainties. The opinions herein expressed represent for the most part the judgment of the majority.

The fruits employed by the Cubans in candy manufacture are the more common tropical ones. The cocoanut, guava and cacao (chocolate) are, of course, staples; all the forms of oranges are used, as also the tamarind and the banana, though the latter is utilized purely for mechanical purposes, not as a basis for candy, its large leaves affording excellent wrappers for squares of paste. In addition to these the seeds of the sesame (*Sesamum indicum*), commonly called "benny seeds," are frequently employed.

In the following list the mode of preparation given is derived from original receipts furnished to Dr. Palmer by the candy women, one of whom prepared a special batch suitable for keeping until his return to this country.

1. Cocoanut (*Cocos nucifera*).

a. *Preserve.* This is sold in the Havana market, and is a regular article on the bill of fare of every large hotel in that city, but it is difficult to obtain in other parts of the island. The shredded meat is cooked in the milk of the cocoanut until the latter is about the consistency of thick syrup. The delicate flavor of the cocoanut is thus fully preserved, and the resulting dish is one of the most delicious of sweets.

b. *Candy.* This is sold in cakes of various shapes and sizes. It is white or brown, according to the color of the sugar employed. Though very good when fresh, the oil contained in the cocoanut is apt to turn rancid after a short while, and in this condition the candy is anything but delectable.

2. Cacao or Chocolate (*Theobroma cacao*).

The home-made chocolate candy of Cuba is a very different article from the prepared cakes sold by the various factories there and in the States. The latter contains merely chocolate and sugar, while the ordinary form is cooked with milk, and often contains only a slight flavoring of chocolate.

When used as a beverage chocolate is made very thick, and is eaten in connection with small sugar cakes.

3. Tamarind (*Tamarindus indica*).

The tamarind is a number of the Pulse Family or Leguminosae, bearing large, thick pods with two or three seeds, the interstices being filled with a thick glutinous mass, of a pleasant acid flavor. These pods, stewed with sugar, form a thick, very rich preserve of delicious quality, but decidedly cloying to the palate.

4. Orange, bitter and sweet (*Citrus species*).

The bitter orange is cooked in light brown sugar and made into a soft paste, which is cut in squares and neatly wrapped in a banana leaf, tied with vegetable fiber. The sweet orange is cooked with sugar until it crystallizes, and sold in hard cakes, like cocoanut candy. Of these two confections the paste is superior, as the sweet orange is scarcely sufficiently pronounced in flavor to impart a taste to the confection.

5. Guava (*Psidium guayaba.*).

This is one of the staple fruits of Cuba, frequently eaten uncooked, but more often made into a jelly (*jalea de guayaba*) or a paste (*pasta de guayaba*). These two "dulces," as they are called, or "sweets," may be found at all stores and markets, and on the bills of fare of nearly all restaurants. The jelly is made like other fruit jellies, but is of a very firm consistency; when fresh and properly prepared it is unsurpassed. The paste is prepared by cooking and mashing the whole fruit, and is more crystalline in texture; it is preferred by some to the other. Both products are put up in long rectangular wooden boxes.

6. Sesame (*Sesamum indicum*).

The seeds of this plant have a distinctive flavor not easily described. One pound of the raw seeds are cooked with twice their weight of sugar and the resulting mixture cut into small squares; or they may be parched and ground before cooking; but to American tastes the latter product is scarcely a success.

In addition to the above list there is a plain candy made of goats' milk and brown sugar which is fairly good when perfectly fresh.

There are no true confectionary stores in Cuba. The home-made candies are sold in the markets or on the street corners by picturesque old negresses, who frequently astonish you with their knowledge of English, and who prove, when questioned, to be natives of Jamaica. There are, however, numerous booths where endless varieties of little cakes and other sweetmeats are sold. In general it must be admitted that the native candies are not the equal of some of those made in our own country.

BRIEFER ARTICLES.

A NEW STATION FOR THE GRAY POLYPODY.

The discovery by Mr. W. P. Hay, of Washington, of the gray polypody (*Polypodium polypodioides*), in considerable quantity at a station on the Maryland bank of the Potomac near Great Falls, adds several hundred miles to the northeastern range of this familiar little southern fern, while the conditions under which it grows are of more than usual biologic interest.

Mr. Hay first observed the fern during the past winter, and noticing how distinct it seemed from the common polypody, thrust a handful of plants into the pocket of his hunting jacket, where they remained, neglected and forgotten, until May 30th of the present year. On the latter date the jacket happened to be again called into service, and the fern was produced, to the amazement of all the botanists who saw it. The following day the writer was kindly conducted by Mr. Hay to the scene of his discovery.

The station lies south of the Chesapeake and Ohio Canal, some distance below Great Falls. The country is rugged, with numerous cliffs and boulders of the Archaean rock which covers this region, interspersed with a somewhat dwarfed forest growth of deciduous trees. Along one of the streams overflowing from the canal are found several masses of rock which support dense carpets of the fern, its fronds dry and curled from the effects of the scarcely shaded sunlight. Intermixed with these patches of fern is a moss (*Grimmia* sp.) and several lichens. Almost invariably the polypody occurs on the most exposed slopes and the steepest summits of the rocks, and the extent of some of the patches would indicate that it has always been at home. At the time of my observation the fronds were dry and curled, but immersion for a few hours in a pan of water wrought a surprising change in their appearance. The old fronds expanded and became fresh and green, while the young ones began to elongate and uncoil, showing the plant to be in perfect condition.

The growth of the gray polypody on rocks in the more southerly portions of its range is unusual. Its preference is for the trunks of trees or fallen logs; in fact, during my travels in the Gulf States, I have never yet seen this fern on rocks. By a curious coincidence, the other species of Polypodium (*P. vulgare*) which is almost universally a rock-loving plant, has been found by Professor Ward not far from this very locality at Great Falls, growing on trees! It would seem as if the two ferns had changed habitats for the nonce, in order to interest the botanists!

CHARLES LOUIS POLLARD.

A GIGANTIC GRASS SEED.

At the meeting of the Linnean Society, in London, on March 20, Dr. Otto Stapf exhibited several seeds of *Melocanna bambusoides*, a species of bamboo, which completely upset the popular idea of grass seed dimensions, the giants of which are presumed to be represented by pedigree wheat and maize, in which latter the huge mass of seeds constitutes, it is true, a very substantial fruitage; the actual seeds, however, are comparatively small. In Melocanna, on the other hand, in lieu of a spike arm or cylindrical mass of associated small seeds, we have solitary ones, measuring no less than 5 in. in height by 3 in. in diameter, a massive pear-shaped body, the size and form of which are as utterly different from our usual idea of a grass seed as can well be conceived. By what evolutionary process this huge solitary fruit has been arrived at is not clear, but as might be expected, the great store of nutriment embodied in so large a fruit favors the development of the associated embryo plant to such an extent that the first product of germination is a robust growth, which practically secures establishment and continued existence. The single seed is thus fully as efficacious, if not more so, in securing reproductions than a very large number of small ones and by its greater individual vigor would probably have an infinitely better chance of survival in a dense, growing Bamboo jungle, where small weakly seedlings would be utterly incapable of reaching the light. This, indeed, is probably the key to its genesis.—*American Gardening.*

THE WILD FLOWER PRESERVATION SOCIETY.

LOCAL CHAPTERS.

The secretary has received inquiries as to the best methods of forming local chapters. Such bodies should be organized in much the same manner as any other society; the usual course of operations is for the person or persons taking the most active interest in the subject to call a preliminary meeting, inviting by letter, circular or any other means best suited to the local conditions, all those likely to take an isterest in the subject. Some chairman, previously selected, should call the meeting to order, explain its objects and introduce other speakers, if there are to be any. He may then entertain a motion for the appointment of a committee to report upon a plan of organization, or the assembly may go into a committee of the whole and organize itself. Permanent officers should in no case be selected until the permanent organization has been completed.

As a preliminary to business of any sort the chairman should read to the assembly Article IX of the By-Laws, governing the action of local chapters, and one of the first duties of the secretary, when elected, should be to report the organization to the undersigned, who will furnish blanks for the enrollment of those who are not already members of the national body, These enrollment blanks should be filled out properly and returned, with the membership fee of one dollar. After this the Chapter is free to carry out such work as it may deem best for the cause, raising and disbursing its own funds, subject, however, to the provision of the constitution that all matter intended for publication be first submitted to the National Board of Managers. The local secretary or other officer will, of course, be expected to send, from time to time, for publication in The Plant World, reports of the work that is being carried on under the auspices of the Chapter.

In large cities it would be well to arrange for a public meeting, with an illustrated lecture or other attraction, to take place under the auspices of the Chapter soon after its organization. At such a meeting some officer should be stationed at the door with circulars and enrollment blanks, as a large number of new members are usually attracted in this way. It may be possible, when our funds have accumulated sufficiently, to send out lecturers of prominence at the expense of the society.

Circulars, essays, and other literature can be had at all times by applying to the Secretary of the Wild Flower Preservation Society of America, 1854 Fifth street, N. W., Washington, D. C.

We clip the following appreciative review from *The Practical Age:*

"The suggestions by Mr. Knowlton on the preservation of plants in the United States are of interest to every nature lover as well as to those who have in addition a technical knowledge of botany. Mr. Knowlton suggests the formation of a society for the protection of plants in every locality, these societies to have a national head. The members are requested first to excite sympathy with the movement by sending printed protests against the destruction of plant life to newspapers and magazines in the respective localities. With the proper sentiment aroused, it is thought that through the influence of such societies permanent legislation upon the matter, such as has been accomplished for bird life by the Audubon society, can be had. Also, that the public taste can be thus educated to favor the preservation of rare plant life. That some such measure is now of pressing necessity, is beyond any question; our foresters have conceded this in the work they have done in preserving the forests from wanton destruction; they have educated, and continue to educate the public taste in the matter of forest love, with great benefit both to the beauty and economic value of our country. Added to this body of workers, the societies suggested by Mr. Knowlton would be found of lasting power in the matter of preserving our plant life."

GENERAL ITEMS.

NOTICE.—THE PLANT WORLD COMPANY offers a prize of Ten Dollars ($10.00) for the best design for the cover-page of this magazine, to be used with the next volume. Competitors must conform to the following conditions:

1. All designs must be in black ink on bristol or other drawing paper, in proper shape for reproduction. No colors are to be used.
2. They must be drawn with a view to reproduction of one-half; so that the actual design must be between fifteen and sixteen inches in length, and between ten and eleven inches in width.
3. Space for the month, number, volume and contents may be left within the design if so desired, but this is not necessary. All designs must contain the words "THE PLANT WORLD. An Illustrated Monthly Journal of Popular Botany. Founded 1897. Official Organ of the Wild Flower Preservation Society of America." The names of the editors need not be inserted unless desired.
4. Competitors may forward their designs, carefully packed, at any time up to November 1, 1902, when the competition closes. Each competitor must write an assumed name on the back of his design, advising us separately by letter marked "Prize Contest" of his own name and address and the nom-de-plume he has employed. There is no limit as to the number of designs to be entered by one person. Postage for return, if desired, should accompany each package.

The judges in this contest will be announced later.

A NEW scientific undertaking has been placed in operation in Sharon, Mass. It is known as the Sharon Biological Observatory, and is under the directorship af Dr. George W. Field, of the Massachusetts

Institute of Technology. Its aims, as set forth in the circulars of information that have been distributed are the promotion, first, of pure science by observation and field work on nature study; second, of education, by emphasizing the importance of opportunities by biological investigation as educational methods; third, of economic biology, by utilizing the biological sciences in the study of practical problems.

The observatory now controls 300 acres of land in Sharon, and expects to add to its holdings from time to time. Among the uses to which this land will be devoted are, a preserve for native wild plants and animals; natural woodland for forestry investigations; and an experimental farm in connection, with which the physiology of domestic animals may be studied and the development of new breeds undertaken. Finally, there is to be a summer school for general nature study, intended especially for teachers, but embracing elementary courses as well. Mr. Samuel C. Prescott, of the Massachusetts Institute of Technology, is in charge of the subject of plant life.

THE recent death of Mr. G. S. Jenman, for many years director of the Botanical Garden at Georgetown, British Guiana, and previously director of the Hope Gardens at Jamaica, brings into prominence the many contributions made by him to fern literature, and their great value to the student of West Indian ferns.

NOTES OF CURRENT LITERATURE.

THE University of Maine Studies, No. 3, contains a preliminary list of Maine Fungi by Mr. P. L. Ricker. This is the most complete list of Maine Fungi that has appeared. It is based chiefly on specimens which are extant.

DR. W. A. KELLERMAN, of the University of Ohio, has resumed the publication of the *Journal of Mycology*, which was dropped by the U. S. Department of Agriculture in 1894. It will be published quarterly at $1.00 per year. Two numbers have already appeared. Bibliographers and librarians will regret the retention of this name for what is in reality a new journal. There is certainly a need for a good mycological journal in this country, and we trust the editor will be heartly supported in this undertaking.

DR. A. ENGLER has an extended article on the Plant Geography of North America, in the May issue of the Notizblatt des Königl. Botanischen Gartens und Museums zu Berlin. It is accompanied by a map showing the boundaries of the different formations as defined by the author.

PART VI. of the second series of the Minnesota Botanical Studies has recently appeared. It contains three articles, as follows: Lichens of Northwestern Minnesota, by Bruce Fink; Corallinae verae of Port Renfrew, by K. Yendo, and Observations on *Pterygophora*, by Conway MacMillan; also an index to the volume.

EDITORIAL.

We have observed some comments on the existence of two societies devoted to plant protection, and there have been inquiries as to the reasons why a consolidation has not taken place. It may be well to discuss this matter at some length, in order to prevent possible misunderstanding and appearance of rivalry. The Wild Flower Preservation Society of America, soon after its organization as a national body, with representatives of all sections on its board of managers, extended to the Society for the Protection of Native Plants, in Boston, an invitation to become the first of its local chapters; but the offer was courteously declined by the older society for the reason that its policy was already established, with definite lines of work in operation, and that although strictly local in management its membership represented a number of States. While it is to be regretted, from many standpoints, that the union could not have taken place, yet there is room for such wide activity in the common cause that no possible harm can result, and the two societies will undoubtedly work together as harmoniously as if they existed under one head.

In the current issue of *Rhodora*, Dr. B. L. Robinson has given a most excellent presentation of the work of the New England Society, and of the conditions demanding missionary efforts. In this connection we would recur to the much discussed advertisement of the botanical features offered by a trip to northern Maine *via* a certain railroad, an advertisement which has appeared for some months in *Rhodora*, and which we notice has been recently rewritten and considerably amplified. It will be remembered that we made some editorial utterances on this subject in our issue for October, 1901, though without mentioning by name the journal in question. This editorial elicited strong protests from several of our New England friends, who regarded our remarks as an affront to the local fraternity. We had not supposed that the language of the editorial could be so construed, but in the light of the earnest and single-hearted efforts now being made for plant preservation by *Rhodora* and Boston botanists generally, there is no doubt that we were in the wrong, and we wish to withdraw absolutely any personal imputations that we may have unwittingly made. While our opinion as to the expediency of inserting such an advertisement in the pages of a botanical journal remains unchanged, we now know that in their motives the editors and owners of *Rhodora* were thoroughly sincere, and entirely guiltless of any thought of sacrificing plant life for pecuniary considerations.

The reasons for admitting the advertisement have already been set forth in *Rhodora*, and it has been demonstrated, we think, beyond question that the localities enumerated are not sufficiently exact to endanger the plants, or if exact stations are given they are for such species as exist in the Aroostook region in countless abundance. And another claim made by the journal is that by means of this advertisement summer travel may ultimately be more or less deflected from such places as Mount Washington, where the alpine flora is really in danger of extinction. On the other hand, as we have observed, from the standpoint of expediency alone we consider the admission of the advertisement unwise, because of the effect it may have on persons elsewhere, who may chance to read of the abundance of a certain species in Maine and may think it no harm to pluck the plant freely in Vermont or New Hampshire, where it may be rare. But this is a matter largely of individual opinion, and we are rejoiced that in respect to the main issue we can join hands heartily with our New England friends and with the Society for the Protection of Native Plants, for which we wish all possible success.

BOOK REVIEWS.

British Vegetable Galls. An introduction to their study by Edward T. Connold, Honorary Gen. Sec'y Hastings and St. Leonard Natural History Society. Small 4°, 312 pp. 130 plates and 27 smaller figures. E. P. Dutton & Co., 31 West 23rd Street, New York. Price, $4.00 *net.*

In this book are described and illustrated the insect galls occurring in the British Isles, so far as the author has at present been able to get them determined with the exception of those occurring on oak, which are so numerous that they have been reserved for separate treatment. The galls are arranged in four groups, as follows: Root-galls, stem-galls, leaf-galls and flower-galls. In the discussion of each gall the name of the organism causing the gall is given and botanical name of the host.

Then follows a description of the gall, its time of occurrence and miscellaneous notes. The half-tone plates representing the "galled" plants give a fair idea of their general appearance. The descriptions of the insects producing the galls are very few and meagre, while illustrations of them are almost entirely wanting. The author seems to regard the subject rather from the standpoint of the collector of museum curiosities than from a strictly scientific point of view. A work describing and illustrating our American galls would be a very desirable addition to our literature and would prove useful to phytopathologists. C. L. S.

CYCLOPEDIA OF AMERICAN HORTICULTURE. By. L. H. Bailey. New York. The MacMillan Co., 1901-1902. Vol. 1, A. D., pp. XXII + 510. Pls. 9, figs. 743; Vol. 2, E. M. Pp. XIV + 511-1054. Pls. 10-19, figs. 744-1453; Vol 3, N. Q. Pp. XV + 1055-1486. Pls. 20-30, figs. 1454-2059; Vol. 4, R. Z. Pp. XXX + 1487-2016. Pls. 31-50, figs. 2060-2800.

This important work has been reviewed from time to time in these columns as the various parts have been issued; but its completion warrants an additional notice. It is the first comprehensive American cyclopedia of horticulture, and as such commands the attention of all students and professional men. Its value to the horticulturist is obvious; to the botanist it is essential on account of the descriptions of numerous genera and the attempted systematic arrangement of species. We use the word "attempted" arrangement, because in the case of many genera such as *Tulipa* and *Gladiolus*, the species originally existing in nature have become so confused by artificial hybridization that it is difficult to present them in proper taxonomic form. The articles have been largely prepared by specialists, whose names or initials are appended, so that the blame for such errors of treatment as exist does not necessarily fall on the editor. More than 450 persons have thus contributed, and the number of articles reaches the enormous total of 4,357, in the course of which over 2,000 genera and about 24,000 species are described. The illustrations are uniformly good, and are so arranged that at least one will be found wherever the book is opened.

The editor has been conservative in the matter of nomenclature, which is perhaps wise so far as the treatment of species is concerned; but it is to be regretted that in names of genera the rule of priority was not more rigidly observed.

In the preparation of bibliography, indexes, etc., Professor Bailey has been assisted by Mr. Wilhelm Miller, whose tasks have been most conscientiously performed. The work is remarkably free from typographical errors, and it may be recommended, unreservedly, we think, as the best of existing horticultural encyclopedias. C. L. P.

THE PLANT WORLD

A MONTHLY JOURNAL OF POPULAR BOTANY

OFFICIAL ORGAN OF THE WILD FLOWER PRESERVATION SOCIETY OF AMERICA.

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ORIGIN OF PLANT NAMES.

By Grace Niles.

1. HISTORY.

COMMON names of plants originated long before the Ionian and Thessalian names of the Greeks or the Latin names of the Romans were thought of; possibly even centuries before Homer sang or those early herbalists of Arcadia first determined to test and designate the mystic and healing properties of plants; the pre-human type of the wandering Arabs and Gipsy bands of the interior lands of Asia designated plants according to their healing or poisonous virtues instinctively, as the lower order of people and beasts of the fields do to-day. The modern scientific names are the outgrowth of advanced civilization, and the Greek and Latin appellations, therefore, are but the explanations of the earliest known common names.

We are prone to ask the origins of many names which have frequently quite outlived the identity of the species themselves. The earliest records of plants, inclusive of their designations, virtues, poisonous and healing properties may be traced to Hippocrates, Aristotle, and Theophrastus (500–400 B. C.). These authors' works are filled with oracular echoes of the traditions before them.

Plant names in reality outlive their true origin, as the early poets outlived their poems. The original names of flowers, therefore, have clung to many species christened centuries before Christ, ever gathering synonyms and confusion, through revision from Theophrastus' and Dioscorides' day to our present century.

Considering that moral and religious maxims, physical phenomena, proverbial sentiments, oracles, the supposed divinations of the gods themselves were clothed in verse long before prose or writing was invented and sung by wandering minstrels, we need not wonder at confusion of the authorship of those first poems of Arcadia, or the entangled identity of species of plants known to the ancients before printing or order were dreamed of.

Flowers have ever played an important part in the worship of mythological gods, and sacred deities. They were thus dedicated to gods, goddesses, nymphs and sorcerers alike. Plutarch even wrote that the roses, known in Greek as *Rhodos*, because of their fragrance, were originally *all* white, and that they were dedicated to Venus, whose blood being sprinkled over them, they became red or pink in proportion to the amount of blood upon them. Philostrates wrote that the rose was the flower of Cupid, who, sitting near his mother Venus at a banquet, overthrew with his wings the heavenly pink nectar and sprinkled the white roses ornamenting the table, after which there were wine or pink colored roses.

The oracles of Dodona were said to be delivered by doves, which arose from the circumstance that the priestesses announcing them were called in the Thessalian language *doves*. The Delphic oracle, dedicated to Apollo, also had among its costly gifts a golden tripod upon which the *dove* or priestess sat while uttering oracles. This stool was formed of the brazen serpent Python, twisted into one pillar showing three golden heads. Apollo killed in contest the serpent, and as unknown received the surname python. The priestess uttering this oracle was known as Pythia. This oracle is very ancient and was celebrated a century before the Trojan war. The eagle, also, is figured allegorically sacred to Jupiter, standing with spreading wings at his feet. Therefore, it seemed appropriate to christen flowers in honor of doves, eagles, dragons and serpents, as well as Aphrodite, or Venus, borrowed from classical mythology.

The universal "Divine Mother" of the old German belief came from "Hulda," signifying the "Gracious Benign." The worship of "Lady Venus" began after the Trojan origin of Rome, and she became the "Divine Mother" of the Roman people, and was worshiped as *Cypris* in her "Cyprian Groves," on the Isle of Cypris. *Cythera* also was another name for Venus, since she dwelt upon the Island of Cythera. The doves were birds sacred to Venus also. After Christ, the veneration bestowed upon *Cypris, Cythera, Aphrodite* or *Venus*, became transferred to *Marianus*, Our Lady, the Virgin Mary, the "Divine Mother" of all nations. The dove, also, was sacred in Christ's day, and the Holy Ghost descended from heaven in the form of a dove upon our Saviour as He descended for baptism. Accordingly, flowers formerly dedicated to Cypris, or Venus, were now christened in honor of Marianus, Our Lady, and so it follows that we have *Marianus violets*, signifying our Lady's violets, and *Calceolus Marianus*, signifying Our Lady's slippers.

It is plainly illustrated that the dove, eagle, serpent, dragon and lamb have ever been held sacred in delivering the will of the gods of profane as well as sacred history; the dove and lamb being symbols of purity, and the eagle, serpent and dragons denote strength and hidden evils. Natural science formed a prominent object of the first Greek philosophers, and furnished subjects for some of the earliest didactic forms. In order to understand the origins of plant names, one must become familar with botanical history and observe the slow progress of increased knowledge in the science from Theophrastus before Christ to our own century.

Beginning with Hippocrates, "Father of Medicine," 400 B. C., we observe that he knew but 234 species of plants. Theophrastus, "Father of Mineralogy and Botany," 225 B. C., knew 500 species of plants and shrubs. He was a naturalist, a pupil under Plato and Aristotle, and is considered our first real botanist, leaving extant works. He left ten books, entitled "Of the History of Plants," which are the earliest known treatises on botany.

Plants were studied in those days mainly for their medicinal virtues, and naturalists and physicians alike, published histories of plant life then, as we publish our *Materia Medica* to-day, solely to aid the student of medicine.

Dioscorides and the elder Pliny lived in the first century, 23–79 A. D. Dioscorides knew 600 species, while Pliny published 800–1000 varieties of plants in his Natural History; *all* in fact formerly known or heard of by the ancient writers before Christ.

Following Pliny, there ensued nearly seven hundred years, in which plant study passed into oblivion, and of which we have little, if any, valuable record. In the seventh century, however, Avicenna, an Arabian, took up the study again briefly, which, owing to the general uprisings and warrings of the nations, was destined to relapse again into utter obscurity. Botany, therefore, made comparatively no permanent progress for 1500 years after Pliny's day, 23–79 A. D., until about Ray's time, 1685–1704 A. D., when 18,625 species of plants were published by him.

The first botanist, however, to actually revive botany after Avicenna was Otto Brunfels, a German, who published a "History of Strasburgh Plants" in two volumes, illustrated with cuts, in 1530. Following him, Leonard Fuchs in 1535, in whose honor our *Fuchsia* is named, and many eminent scholars of the period, began to study plant life. Herbals floras and botanical gardens soon began to give signs of the deep interest felt in the study throughout civilized lands.

The cultivation of plants for medicinal purposes dates as far back as the elder Pliny, 23–79 A. D., who writes of the Garden of Antonius Castor, at Rome. The Benedictine Monks of Northern Italy later grew medicinal herbs in their gardens, and slowly the study and culture spread northward to the Monastery of St. Gall, near Lake Constance, Switzerland, in 1020. Another garden of this nature was formed at Salerona, in 1309, and in Venice, in 1330.

In 1309, the early Benedictine Monks founded an Academy of Medicine, known as "*Civitas Hippocratica,*" at Monte Cassino, in Campania, Italy. This Academy is considered the *first* school connected with a garden of medicinal plants.

Botanical gardens strictly speaking were not organized until about 1545, in Padua, Italy; at Pisa, in 1547, and at Bologna, in 1568; the latter was under the directorship of Aldrovandi and Cesalpino later.

Soon the northern parts of Europe awakened botanical research and a garden was established at Leyden, in 1577, and another at Leipsic, in 1579, contained rare collections of living plants.

Heidelberg and Montpellier also furnished gardens of note in 1596, while Paris established another in 1597. The Oxford Garden, the oldest in England, was established about 1630, and has existed thus 272 years, and was organized through the efforts of the Earl of Danby.

Among the earliest and most eminent students of botany, we find that Leonard Fuchs followed Otto Brunfels in 1535, and was the first to define the parts of a flower. He published a system of botanical terminology in 1542. He may be said to be the first to lecture on plants, dealing with their virtues and structural parts, each bearing a descriptive name. He was connected with Würtemberg University at Tübingen, and lectured frequently from 1535 to 1566. The botanical garden connected with this school was not established until 1662, however, nearly a century after the death of Prof. Fuchs. The latter figured about 500 species of plants in his "*Historia Stirpium.*" Several genera were distinguished by him according to their natural affinity. He studied plants themselves and thus his quaint wood-cuts are valuable even at this day. His species were arranged in alphabetical order, however, and did not conform to a definite system of classification.

[TO BE CONTINUED.]

NOTES ON THE ORIGIN OF CULTIVATED PLANTS.*

THE APPLE.

BY F. H. KNOWLTON.

IT is my intention to begin herewith a presentation of a series of notes* on the origin of certain cultivated plants, not so much with the idea of making any original contribution to the subject as to present to our readers some of the more or less well-known facts regarding the origin of plants that have become, in one way or another, useful to man. As most of the commonly cultivated plants have been under culture from a very early period, their original home, and the manner of their introduction into cultivation, is often little known. In other cases this introduction has been so recent, comparatively speaking, that we can find all the steps duly recorded.

It seems probable that when man was merging from the so-called pre-human state into the human state, he crudely classified the plants by which he found himself surrounded and on which he largely subsisted, into two categories: those useful and those not useful, which latter groups he doubtless soon learned to further subdivide into those distinctly injurious, and those simply without useful properties.

In certain tropical countries where plant life is so luxuriant that little actual cultivation is necessary, the above classification, or something akin to it, may still prevail, but in temperate lands man must sooner or later have come to appreciate the dangers of depending on the uncertain supply from plants in nature, and so began, in a crude way, the cultivation of the kinds of plants he had found most useful. From that hypothetical time to the present there is almost every step.

At first thought it might seem a reasonably easy task to determine the original home of a plant. One may, indeed, obtain much valuable information on this subject by studying collections of dried plants, manuals of botany, or works of travel or history, but these sources are often inconclusive. It is not infrequently found, on consulting herbaria, that the collectors of plants have too often neglected to state whether a particular plant was obtained in an absolutely natural condition, or under conditions that might have been due to previous culture or introduction by man. Thus the tuna *(Opuntia)* is now wild everywhere in the Holy Land, yet it is an American plant and was introduced there within the last three hundred years, and the Mexican Ageratum of common household cultivation is an abundant weed in the Eastern Himalayas, whither it has gone within the last fifty years. Manuals of botany, particularly those covering countries known or supposed to be the home of certain of our cultivated spcies, are indefinite on just these points, and works of travel, while frequently mentioning the useful plants of a country, are often without much scientific accuracy or merit. But unsatisfactory as these sources of information are, they are frequently all that we have recourse to.

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*These will be presented at irregular intervals, and not in a continuous series.—ED.

Inasmuch as the apple is perhaps the most important of our pomological fruits, and is grown in every temperate part of the world, we may appropriately begin this series with some of the facts regarding its origin and spread.

In the first place, a brief account of the etymology of the word apple may not be without interest. Although the apple is now quite extensively cultivated in Mongolia and Thibet, there is no Sanscrit name for it, according to DeCandolle, and hence it is assumed that it was unknown to the Eastern Aryans. On the other hand the Western Aryans appear to have found it, either wild or cultivated, when they swarmed toward the west, and we find applied to it the name they found or gave it. The root of this name was *ab*, *av*, *af*, *ap*, giving *aball* in Erse; *afal* in Kymric; *apfal* in old High German, and *appel* in old English. The Greeks gave to it the name *mailea* or *maila*, and the Latins *malus*, *malum*, words whose origin is uncertain. The scientific name of *Pyrus malus*, or *Malus malus*, as the rules of nomenclature now require, is, of course, from the Latin.

It is said that there are between four and five thousand varieties of apples known at the present time, but whatever the number, size, quality, or appearance, they have all been derived from two stocks—the common apples from *Pyrus malus*, and the crab apple from *Pyrus baccata*. The apple, par excellence, is the fruit of *Pyrus malus*. It grows wild throughout Europe, in the southern part of the Caucasus, and in some parts of Persia. In the mountains of the northwestern portion of India it was found by Sir Joseph Hooker in an apparently wild state, but it does not appear to be found in Siberia, Mongolia or Japan. The cultivation of the apple undoubtedly began in prehistoric times, as it is found abundantly in the remains of the lake-dwellings of Switzerland and that representing a time before the inhabitants possessed metals. Oswald Heer, a celebrated student of fossil plants, has distinguished two varieties of apples from the lake-dwellings. They were small fruits which were cut in two lengthwise and dried, probably for winter use, by the inhabitants.

From Greek and Roman history we learn that the apple was early known in these countries, having been introduced into Rome in the time of Appius Claudius (449 B. C.). According to Pliny the Younger, who flourished during the end of the first and the beginning of the second centuries, it was grown in orchards; he speaks of twenty-two distinct kinds under the names of Claudians, Pompeians, etc.

I HAVE found the following rules in cutting and keeping flowers both practical and useful. First, as to cutting. A sharp knife is the right tool for the purpose, as it leaves the sap-vessels of the stems open for the absorption of water, while scissors crush and compress these vessels, so that their absorptive power is more or less destroyed. Like injury may be done by breaking off the stems, especially if they are tough. If the flowers are not put into water immediately, the ends of the stems should be cut off with a sharp knife, as the sap-vessels will probably have become clogged up with coagulated matter.

Cut flowers often suffer from too dry an atmosphere. It is difficult to avoid this in our artificially-heated rooms, but we may at least put the blossoms in the coolest part of the room. Near a window and especially in a bay-window, the temperature is generally several degrees lower than in other parts of the room, as you can see if you will test it with a thermometer. The best authorities say, morever, that the flowers should have the benefit of light, and even of sunshine in most cases, though there is a popular prejudice against exposing them to the latter. On the other hand, they suffer, as plants do, from draughts and from sudden alterations of temperature. When flowers have been carried a long distance in close boxes or cases, they often appear withered and worthless, but with proper treatment they may be revived and restored to their original beauty. Instead of being at once put into vases and exposed to the hot and dry air of the parlor, they should either be carefully spread out on wet flannel or moss and covered with a dish-cover or an inverted box, or else put in pans containing moss and water, or wet sand, in which they can be set upright, and then shut up in the dark for a few hours.

G. B. Griffith, in *Vick's Family Magazine.*

An interesting article on the ferns of Jamaica appears in the 1901 volume of the Transactions of the Botanical Society of Edinburgh (XXII, Part 1), by the Rev. Dr. Paul. In the course of a comparison of the relative area of Jamaica and Invernesshire, in Scotland, he refers to the fact, interesting to those ignorant of it, that whereas in the whole of the British islands there are 47 species of ferns, Jamaica contains 473.

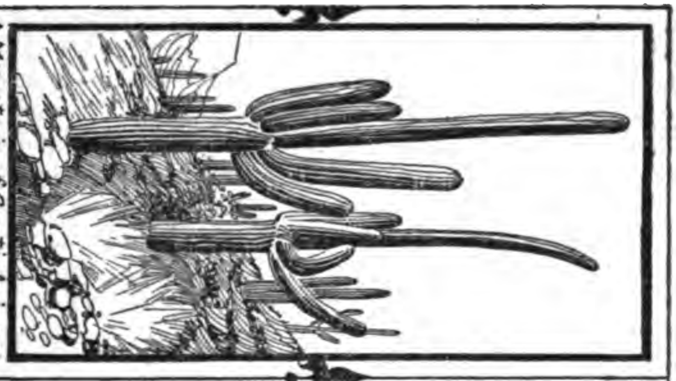
BRIEFER ARTICLES

THROUGH THE ARID LANDS OF THE SOUTHWEST.

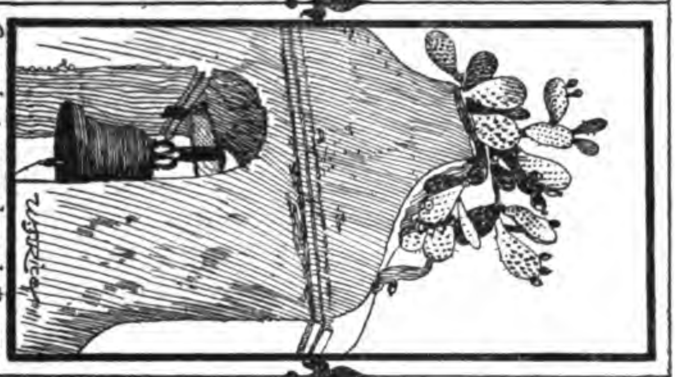
An erroneous impression often prevails that the deserts of the Southwestern States, inhospitable though they be, are wholly destitute of plant life. A glimpse of those arid wastes will correct this impression wonderfully. It is true, however, that there are regions of arid plains and barren mountains. The soil is of sand, encrusted with alkali, and the mountains are rocky, bold and inhospitable, with miles of disintegrated rock sloping away from their bases—wrenched and worn by the action of the waves upon this prehistoric ocean shore. In vain the moisture-laden clouds from the Pacific attempt to glide over the snowy summits of the San Bernardino Mountains; or, if they do succeed in their endeavor, they are generally dissipated into imperceptible vapor by the intense heat of the sun. Strange, then, that not only do plants grow there, but flowers bloom and forests dot the dreary wastes, forming one of those queer paradoxes that are so hard to understand. The grease-wood, a bush with minute leaves of a dull olive-green color, grows in considerable abundance; and a number of other pale sickly looking plants spring mysteriously out of the sand. But the so-called Yucca palms and the cacti are the most conspicuous and characteristic plants of the desert; and they are quite in keeping with their inhospitable surroundings by being well armed with spines, thorns, or barbs, which make them wicked neighbors when one comes too closely in touch with them. The Yucca palm, known also as the Joshua tree, is the most conspicuous growth on the Mojave Desert. It is a weird, fantastic form growing to a height of fifteen to twenty feet, with long, stiff, bristling green daggers all over its trunk and limbs in place of leaves, and with its branches bent and twisted into strange shapes. Growing isolated or in patches, this tree forms veritable forests in places.

The countless species of cacti may also be found there, as well as in the Colorado Desert, which, at Salton, the lowest point, is 263 feet below sea level. The species of cacti known to the eastern collector as potted plants, and of which he is very proud if their slow and prickly growth assumes the size and proportions of a cocoanut, develop in the Colorado Desert and in Arizona such wonderful growths as to compare favorably with forest trees.

Nature, it seems, intends that everything shall serve a purpose, and though the cactus is a fierce and rebellious thing to handle, nevertheless, man has discovered a variety of uses to which it may be put. Rid-



A Mountain of Cacti Arizona



Growing on a church tower

Yucca Palms Mojave Desert

ing one day over the sandy plains, near Tucson, Arizona, the writer saw the giant cereus cactus covering the slopes of an entire mountain. It was the strangest sight ever beheld. The great, dark green, fluted columns of this plant rose 18 to 30 feet in the air. It bears in its season a large white flower that opens like a chestnut, and has inside a red, flesh-like pulp of which the Mexicans and Indians are very fond. The flavor is sweetish; rather insipid. The trunks of the giant are divided through their length by strong white ribs which the natives use as beams for the roofs of their houses. The Bisnago is low and round, about the size and shape of a pumpkin. The Mexicans cut the white pulp of this cactus into small pieces, boil them in sugar and obtain a choice bon-bon. The Datil grows to a height of five or six feet, with branches that diverge at right angles. The fruit resembles a cucumber and contains black seeds, which the Indians grind into flour. The prickly-pear cactus is the greatest fruit producer of all the tribe. The " pears " are about the size and shape of a Bartlett, and have rather a pleasant taste, not unlike watermelon. They contain so many seeds (and one invariably gets a number of tiny prickles in his skin, which cause much pain and discomfort) that, unless he knows the Mexican's scientific method of eating them, he had better let the "pears" alone. This plant grows very luxuriantly about the missions in California, notably at Pala, where one has established itself on the very apex of the adobé bell tower, flourishing there as composedly as if growing on terra firma.

THE WILD FLOWER PRESERVATION SOCIETY.

SINCE the Society began its active work we have received numerous inquiries from many members as to the plants most in need of protection. Mrs. Elizabeth G. Britton, of our Board of Managers, has prepared the following notes on the subject, systematically arranged according to families. The explanations given of the various methods of reproduction and propagation are important, and should be studied with care, for upon this depends the degree of harm that will ensue from plucking. It is recommended that members circulate this article freely among their friends. Reprints of it may be obtained by addressing the Secretary.

HOW THE WILD FLOWERS ARE PROTECTED.

BY ELIZABETH G. BRITTON.

All around us are examples of "the survival of the fittest." The sensitive fern is identical with its fossil ancestors, dating back to the Cretaceous, many thousand years ago; the maiden-hair fern has no near relative, except in Japan. How have they adapted themselves to changing conditions? And what has made it possible for them to survive in the struggle for existence? We propose to turn over the pages of Illustrated Flora hastily, and select in all the larger families a few examples of the showiest and most common "wild flowers," indicating what ways they have arrived at a measure of protection, and how they may be least injured by picking.

Ferns.—The royal, cinnamon and interrupted ferns are frequently transplanted; their large rootstocks and decorative foliage render them particularly desirable, but they prefer moist and shady places, and will not thrive in dry or sunny locations. The Christmas fern and maidenhair need wood loam and shade; they are frequently gathered, as well as transplanted, and both have strong, long underground stems. The maiden-hair has been exterminated from several stations near New York City by men who dig it up for sale; it used to be abundant on the Palisades, between Fort Lee and Pleasant Valley, and should be protected elsewhere in that region. The climbing and walking ferns are rare in this vicinity, and should be protected by private owners.

Club-mosses.—The ground pine is annually gathered in large quantities for making into ropes of Christmas greens; but it is gathered in winter, and its subterranean rootstocks are not disturbed; therefore, it is not exterminated, though not common in this region. Statistics and personal experiences of its collection would be of interest.

Grasses and Sedges.—These are more liable to be replaced and excluded by cultivation than by picking; only a few of the showiest, such as the cotton-grasses, are popularly gathered, and these are protected by strong roots and thick, bunchy stems.

Arum Family.—Jack-in-the-pulpit is the best known and most popular plant; it is easily uprooted, and reproduces rather slowly from seeds and corms. The editors of *St. Nicholas*, and the teachers who illustrate Whittier's poem in the schools, should try to prevent its destruction as far as possible, and encourage those who have the opportunity to watch it in favorable locations, to record its rate of increase and relative abundance. It is a perennial, and should be gathered without the corm.

Lily Family.—Several species of wild lilies are not uncommon within the limits of Greater New York. They are protected by bulbs growing deep in the soil, and will even survive in mowing fields and old pastures. Cultivation and drainage will exterminate them. The adder's-tongue is still abundant in this region; its corm grows deep in the ground, and is seldom collected. Draining and grading have exterminated it at many stations. The star-of-Bethlehem is deserving of cultivation, as it is very beautiful, and it spreads on waste grassy banks. Lilies-of-the-valley also should be planted in shady places. Trilliums have thick, fleshy roots, and are still fairly abundant in this region.

Iris Family.—The blue-flags grow in wet places, have thick rootstocks, and the flowers wither quickly, so that their extermination is not imminent, but they are worthy of cultivation in swampy places.

Orchid Family.—All our orchids are becoming rare, and are eagerly sought for by those who know them. The moccasin flower has neither bulb nor rootstock to protect it, and private owners will have to guard it from depredation, and study how to increase its numbers. The same is true of the yellow and white ladies' slipper, and the home of *reginae* should be guarded like that of the queen-bee. The fringed orchids, white, yellow, orange and purple, still survive in wet meadows on mountain and sea-shore; their best protection seems to be mud and mosquitoes, but the growth of seaside resorts and the drainage of waste lands in this vicinity are fast exterminating them from swamps where they were formerly abundant. *Pogonia, Arethusa* and *Calopogon* still survive in a few places, and only by private protection will they remain abundant. South and Midland Beach resorts have destroyed that station on Staten Island, and the Meadow Brook colony, on Long Island, threatens destruction to *Arethusa.*

All discussion of trees and forestry questions are omitted from this paper. Willows might be planted in one of the public parks of the city in order to supply the school children with "pussy willows." The teachers have asked us repeatedly to do so.

Purslane Family.—Spring-beauty is still abundant in our parks and suburbs, and fills bare muddy banks of the Bronx in spring with its lovely pink and white blossoms; it is protected by a tuberous root, deep in the ground, and its numerous seeds. It has some of the vitality of the "pussley"

Pink Family.—Wild pinks bloom from Monday to Friday on rocky hill sides in Bronx Park, and disappear on Saturdays and Sundays in spring. They reappear the next year, protected by large, fleshy roots, but they cannot reproduce from seed, and will gradually grow weaker and fewer. They still survive in abundance on Staten Island and in Westchester County and should be guarded by private owners.

Water-lily Family.—Water-lilies held their own fairly well until the streams are polluted by sewage, and the ponds drained; they are protected by large fleshy tuberous rootstocks. Musk-rats are fond of these tubers, and will destroy them and those of the lotus.

Magnolia Family.—The fragrant and showy blossoms of our wild species are offered for sale wherever they grow, but the growth of seaside resorts along the Jersey Coast, and the consequent draining and building have done more to exterminate them than all else.

Crowfoot Family.—Marsh marigolds are protected by growing in very muddy places, and reproducing abundantly from seed. They are still common on Staten Island, in a few places, and in Westchester County, but the street vender gathers them in large quantities, and statistics should be gathered to show whether they are being exterminated or not. They should be planted in private places in wet places with the iris. The wild columbine is a perennial, and if left undisturbed will multiply on rocky hillsides; but it seldom escapes the depredations of visitors to our parks and suburbs. It is protected by thick roots, growing in rocky crevices, but is fast growing scarce. Anemones persist in spite of picking and early spring fires; the latter are the most destructive They are protected by fleshy rootstocks and tubers. The hepatica' appeals in so many ways to lovers of wild flowers, that it requires special protection, and owners of woodlands where it grows should forbid trespassing or picking. It is no longer common. Buttercups are not eaten by cattle on account of their bitterness, and reproduce abundantly from seed, besides being protected by thick roots. They are frequently common and abundant. One of the few stations for a rare species of clematis is threatened on Staten Island, by the golf links of the Country Club at Dongan Hills. It could be easily preserved.

Poppy Family.—Poppies are not common in grain fields in America, and we miss a great pleasure in consequence. The blood-root is not rare on rocky hillsides in Westchester County, and is readily transplanted, even surviving the miseries of a city yard; it still may be found in a few of the parks and parkways of the Bronx and Richmond, but needs protection, in spite of its fleshy rootstocks. Dutchman's breeches may still be found in a few places in Manhattan and the Bronx; it is protected by its granular bulbous roots; fires and building will soon exterminate it. It has grown more abundant in the Bronx Park since it has been protected, but only public sentiment, and teaching the children not to pick it, will allow the blossoms to go to seed.

Mustard Family.—Few of the members of this family are attractive enough to be popular; many are weeds, and all reproduce by an abundance of seed. Water-cresses deserve to be planted in ditches and streams.

Pitcher-plant Family.—In places suited to its growth, the pitcher-plant is fairly abundant, and is also taking possession of abandoned berry bogs. It is not found in the immediate vicinity of the city, but it was formerly known to grow in a bog near Richmond.

Witch-hazel Family.—The manufacture of Pond's and other extracts must consume large quantities of this shrub. It would be interesting to learn whether the method is destructive of the native supply, or whether they depend on cultivation. It is not abundant in this region.

Rose Family.—Wild roses seem to grow readily in all waste grounds. Their seeds are disseminated by birds, and in many seaside colonies, where artists and good taste prevail, they are protected and planted. This is especially true of the sweet-brier, ninebark, mountain ash,varirious species of crab apples, thorns, etc. In fact, the ornamental species in this family are numerous and highly appreciated.

Pea Family.—The lupines take possession of waste sandy ground in Richmond and New Jersey, and their showy blue flowers are highly attractive; they have long, fleshy roots. Clovers are frequently cultivated, and have spread as weeds; they are perennials, and reproduce from seed. In many species of this family the seeds are particularly fitted to reproduce the species.

Geranium Family.—The wild geranium is always gathered, but it withers very quickly, and does not revive; it is protected by a thick perennial rootstock.

Sumach and Holly Families.—They are not appreciated at home as they are abroad, or we should plant them more, and preserve them oftener. There is not a more decorative mass of foilage than the sumach, nor more symmetrical and beautiful shrubs than the American holly and winterberry. Statistics with regard to the trade at Christmas in the last named would probably show a large decrease in the supply. It has been completely destroyed on Staten Island, where formerly it was abundant, and the supply now comes from the Southern States.

Mallow Family.—The rose mallow makes glorious patches of color in marshy meadows in the vicinity of New York, and is likely long to survive: it grows readily from seed in dry locations, also, and is worthy of cultivation. Its flowers wither too readily to be picked.

Violet Family.—These flowers are generally gathered in bunches, and the roots not disturbed: they seed quickly and abundantly, so that violets are still common in the suburbs, and are not likely soon to be exterminated. The showy bird's-foot violet suffered at the time of the Spanish war, when the regiments were encamped on the Hempstead Plains; but market gardeners are its worst enemies. On Staten Island the Country Club could protect it within the limits of its domain.

Carrot Family.—The wild carrot, cow-parsnip, water-hemlock, caraway are all familiar as weeds, but are decorative, and should be made familiar to children, in order that they may avoid poisonous species.

Dogwood Family.—The popularity of the showy flowers and fruit of this tree render it particuarly difficult to protect it in our parks and suburbs; it is still fairly abundant in Richmond, and should be preserved in all private parks, cemeteries and grounds. Other species of cornels are also worthy of cultivation, as well as the tupelo and white alder, belonging to the Clethra family.

Wintergreen Family.—The manufacture of oil from the leaves has materially reduced the supply of this delightful plant; modern substitutes may give it a chance to recuperate. The pyrolas also deserve protection, as well as the pipsissewa, prince's pine and Indian pipe.

Heath Family.—This family is rich in ornamental shrubs, which always fall victims to vandals in our parks and suburbs. Wild azaleas, rhododendron, laurel, are always denuded of their showy blossoms, and the laurel loses its leaves in winter for Christmas greens, hence it is on the verge of extinction in Highbridge and Bronx Parks; in both places it was once abundant. The last plants of trailing arbutus also have disappeared from the region within the last year. Owners of private places where the latter plant grows will have to protect it, if they want to preserve it. Blueberries are so desirable for their fruit, that large tracts in New Jersey and Long Island have been burned over, in order to increase their growth. The taller species are very decorative.

Diapensia Family.—The pyxie is rapidly sharing the fate of the trailing arbutus. Galax is being used to such an extent for funeral wreaths, that it would be interesting to learn what effect it has had on the wild supply. Only the leaves are gathered.

Gentian Family.—The sabbatias and fringed gentians occasionally are found for sale in our cities; they are always popular, and are not common; they are generally uprooted when picked, and not readily transplanted or raised from seed. Methods for protection or propagation are desirable.

Silk-weed Family.—The showy orange colored flowers of the butterfly weed are sure to be picked, but it has large roots, and spreads readily by winged seeds, so that it is widening its range. It deserves to be cultivated.

Mint Family.—Many species in this family are cultivated for the aromatic oils they contain, and have escaped from cultivation. The bee balm is worthy of cultivation.

Potato Family.—Few members of this family are showy; the nightshade has bright red berries which are poisonous.

Figwort Family.—The mulleins, toad-flax, snake-head, gerardias, yellow foxgloves, pentstemon and painted-cup are popular plants. The orange-colored flowers of the latter are very showy, and the plant is not common and easily uprooted. Its parasitic habit renders it almost impossible to transplant or cultivate, so that it is in need of protection. It used to be abundant at Pelham, but has disappeared from there.

Madder Family.—Bluets are universally loved and gathered. They will stand transplanting and improve in cultivation. They deserve to be propagated and protected. They are rather local and not abundant.

Honeysuckle Family.—Elders and viburnums are showy both in flower and fruit; they deserve protection when native and cultivation in masses. The trumpet-honeysuckle still exists within the limits of Greater New York, and would continue to exist in our parks, if the showy flowers did not particularly attract attention, and the aphids were not so fond of the leaves. The twin-flower used to grow in New Durham Swamp, and was also found once near Patterson, but has long since disappeared from the region. It should be protected by private owners.

Bell-flower Family.—The harebell grows in crevices of rocks in many inaccessible places, hence it is still to be seen on the Palisades and on rocky cliffs along the Hudson. It is still not uncommon in the Catskills and the Berkshires. Of the lobelias, three species are showy; the cardinal-flower, the great blue lobelia, and the pale blue spiked one; all are perennial and deserving of preservation and cultivation.

Chicory Family.—Chicory and dandelion take care of themselves, not only making long fleshy tap-roots, but flowering abundantly and scattering their seeds far and wide.

Ragweed Family.—Such is the power of reproduction of the ragweed that it takes posession of all cultivated fields after the crops are gathered, and spreads into waste places and roadsides. Considering what a nuisance they are to persons afflicted with hay-fever, they deserve to be suppressed.

Thistle Family.—The Compositae reproduce readily by seed, as shown by their abundance, filling fields and roadsides with a wealth of bloom. There seems no danger of exterminating them, and we may all revel in asters and golden-rods, daisies and cone-flowers, sunflowers and thistles, boneset, coltsfoot, tansy and wormwood. About 760 genera and not less than 10,000 species of wide geographical distribution.

The plea for protection occurs so many times in this enumeration, that we may be accused of wanting to enforce as stringently as they do in England the laws of enclosure and trespassing. We disclaim at once all desire and wish to lessen the delightful freedom of our life in the country, or to encourage high fences and multiple signs against trespassing. But when our freedom leads to disregard the rights of others, it is high time we were taught to enjoy without destroying, to leave for others and for ourselves in future years the beauties that surround us. With the increasing love for out-door life and travel, the American public is developing a great fondness for nature study, and books abound on all branches of the subject. Children and grown people are studying birds, plants and animals in a way they never did before. Let us then coöperate with all teachers, students and societies not only to instruct, but to preserve for the future the birds, plants and animals, and let us learn wise lessons from the past, not to exterminate the wealth of beauty that still remains. If public laws and public reservations will not do this, then let the private individuals assert their rights, and prevent ruthless vandalism. We have awakened to the dangers of the destruction of our forests; we hope in time to save some of them, as shown by the efforts of the American Forestry Association, and the various state organizations. The laws against fires and theft are ample; it rests with the people to enforce and obey them. We have made a beginning in several states to protect the arbutus, climbing fern and giant sequoias; let us now create such a strong public sentiment against all vandalism, that all other rare and beautiful plants and animals will be protected also.

GENERAL ITEMS.

MR. H. TULLSEN, of Kyle, South Dakota, writes that two plants not mentioned in Coulter's Rocky Mountain Flora have been observed by him in South Dakota: *Celastrus scandens*, the bittersweet, which grows along ravines of Medicine Root Creek, Pine Ridge Indian Reservation, and *Verbena urticaefolia*, the white vervain, collected in low grounds on Medicine Root Creek, July 16, 1902.

WE learn from *The American Botanist* that a new society, known as the American Botanical Club, has been organized. From the rather vague statement of its objects we gather that it is to be somewhat of a resurrection of the Gray Memorial Botanical Chapter, which carried on active work a decade ago. The annual dues are fifty cents. *The American Botanist* will be the publication organ.

MR. ERNST BESSEY, of the Bureau of Plant Industry, Department of Agriculture, has gone to Europe for an extended stay, first in the prosecution of some official investigations, and later as a student at several of the German universities.

EDITORIAL.

We have had occasion several times to note the progress that is being made by the New York Botanical Garden. This institution was formally organized in 1891, though active work on the ground was not begun until some years later, or about 1896. Within the short space of five years it has grown to be, in many respects, the leading institution of its kind in this country. The location is naturally well adapted for a botanical garden, and steps were at once taken to retain many of the original features as nearly as possible in a state of nature. To this has been added the hundreds of species of herbs, shrubs and trees now growing there, representing very satisfactorily the varied flora of this country. In the green houses are some 3000 additional species. There is a fine Museum and Laboratory building, wherein is perhaps the largest herbanium in the country, and for the care and study of each of the greater divisions of the plant kingdom there is an officer and one or more assistants. The managment is broad and liberal and it is altogether a monument to botanical study. It is to be regretted that the U. S. Government has not seen fit to establish a properly equipped institution of similar scope at the National Capitol. The present botanical garden is in wholly inadequate quarters, and the national herbarium is seriously handicapped for lack of space and proper equipment. Every European country, even the smallest, has its botanical garden and properly organized herbarium, and we should have the same here. While America leads the world in so many lines, it is a matter for serious regret that in this respect we do not keep pace with other countries. It is true that this government is fostering original research in botany as perhaps no other one is, yet there is room for advance in the way of a National Botanical Garden worthy of the name.

APROPOS of the article on "A New Station for the Gray Polypody," in our last issue, the following note is of interest:

"EDITOR OF THE PLANT WORLD: Mr. Pollard is wondering that the little fern, *Polypodium polypodioides*, is growing on rocks. In the two stations here in the vicinity of St. Louis, it is growing on white sandstone. Also in the Cumberland Mountains in Tennessee, it is growing on rocks. HENRY EGGERT."

BOOK REVIEWS.

A UNIVERSITY TEXT-BOOK OF BOTANY. By Douglas Houghton Campbell, Ph. D., Professor of Botany in the Leland Stanford Junior University. 8vo., 579 pp., with many illustrations. The Macmillan Co., New York, 1902. Price, $4.00.

The author informs us in the preface that he has attempted "to present in as compact a form as possible an outline of the essentials of modern botany," also that the book "is designed primarily as a work of reference." As a university text-book we are sorry to say this work does not meet our expectations. There will no doubt be differences of opinion as to whether the author has succeeded in his purpose, as set forth by himself.

After an introductory chapter of 11 pages the morphology of the plant body and the plant cell are discussed; this portion of the work covering 65 pages. The greater portion of the work, pages 67–459, is devoted to taxonomy. In the discussion of the various groups there is necessarily much of morphology also.

The subject of physiology is next taken up; pages 461–493 being devoted to it. The volume closes with a chapter on "Relation to Environment" and one on "Geological and Geographical Distribution."

To our mind the work lacks the symmetry and fullness which should characterize a university text-book. The word university should mean more to American students to-day than it did ten or twenty years ago, and all text-books intended for such institutions should tend to elevate the standard. The book is profusely illustrated with text-figures and half-tone plates. At the close of each chapter there is a bibliography containing reference to the principal literature relating to the subject discussed in the chapter. The work will no doubt prove helpful to students and general readers of the subject. C. L. S.

AN ANALYTICAL KEY TO SOME OF THE COMMON FLOWERING PLANTS OF THE ROCKY MOUNTAIN REGION. By Aven Nelson, A. M., Professor of Botany in the University of Wyoming. Twentieth Century Text-Book Series. New York, D. Appleton & Co., 1902.

The title of this little book is somewhat misleading, for instead of being simply a key, which in the technical sense is merely a tabular presentation of contrasting characters, it is really an abridged manual of botany, with descriptions of genera and species.

The book is offered, as we learn from the preface, not as a substitute for the larger manuals, but as an introduction to them, the theory being that for practical purposes the student may gain a sufficient knowledge of systematic botany by learning to recognize a few species in each genus and a few genera in each family. This method has been followed in other American text-books, notably the various editions of Bergen's Botany; but it is a practice that we cannot conscientiously commend. It is a difficult matter to select special types for description and still convey a thoroughly well-balanced impression of the natural groups of plants. We notice, for example, that although Mr. Nelson professes to include only the common species, "and especially those that blossom during the spring and early summer," there are numerous examples of recent segregates, which the student would with difficulty recognize. The descriptions are written in a clear, succinct style, and the typography and general arrangement of the book leave nothing to be desired. Professor Nelson has followed the example of other recent authors in giving a vernacular name for each species, if possible, a translation of the original. This leads to such nomenclatorial absurdities as "Simple Tetraneuris," "Porter's Oreocarya," and "Unsavory Raspberry." The use of such names by amateurs is, we fear, theoretical rather than practical.

In scientific nomenclature Prof. Nelson, of course, follows the Rochester code. C. L. P.

Lamarck, the Founder of Evolution. His Life and Work, with Translations of his Writings on Organic Evolution. By Alpheus S. Packard, M.D., LL.D., Professor of Zoölogy and Geology, Brown University. With illustrations. Large crown 8vo, $2.40 net. By mail $2.60. Longmans, Green & Co., 91 and 93 Fifth Avenue, New York.

The value of Lamarck's contributions to the theory of evolution has long been a matter of discussion among scientists. That there is no very general agreement on this subject is, in part at least, due to lack of a thorough understanding of Lamarck's views. Professor Packard has done a great service in bringing together the scattered literature and facts regarding this naturalist and his work. This book is the result of long and careful research, and a very acceptable contribution to evolutionary and biographical literature.

The biographical portion contains many additions to our scanty knowledge of Lamarck's life and personality, and is accompanied by several portraits. There are many quotations from original documents bearing both upon his life and upon his work and views as a naturalist, so that one is able to form his own judgment regarding the theories he advanced. The book will be read with profit by all who are interested in the evolution of evolutionary theories. C. L. S.

THE PLANT WORLD

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EXTRACTS FROM THE NOTE-BOOK OF A NATURALIST ON THE ISLAND OF GUAM.—I.

BY WILLIAM E. SAFFORD.*

ILLUSTRATED.

SUNDAY, August 13, 1899.—Sighted the island of Guam at daylight, apparently a flat table-land in its northern part, and rough and mountainous in the southern. Steamed in to our anchorage in the harbor of San Luis de Apra, where we found the *Yosemite* and *Nanshan* at anchor, the former with the governor, two companies of marines, and a surveying outfit on board. Passed very close to the promontory of Orote on our right, observing great numbers of cycads growing among the rocks, like low tree-ferns with glossy plume-like fronds; further in the village of Sumay, on a low stretch of sandy beach fringed with coconut palms. On our left the low rocky island of Apapa, also called *Isla de Cabras*, or "Goat Island." In prolongation of this a long coral reef, which is uncovered at low tide. Near the head of the bay, a rocky islet crowned by a fort upon which the *Yosemite* people have established their observatory. This is in latitude 13° 25′ 45″ north, and longitude 144° 39′ 28″ east of Greenwich; so that Guam is about as far north of the equator as Samoa is south of it.

The harbor is large, but is taken up with submerged coral reefs throughout a great part of its extent. It is without protection from the northward and westward. On looking at the map it appears that the island is of irregular shape, only about four miles wide in the middle and seven to nine miles across the northern and southern portions. Its length from NNE. to SSW. is about 29 miles. The greater part of the island is covered with trees interrupted in places by patches of cultivation; along the west coast are stretches of sandy beach fringed with coconuts, and with our glasses we can make out grassy patches on the higher hills, called *sabanas* by the natives.

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*During the administration of Governor Leary, directly after the close of the Spanish war, Lieut. William E. Safford, U. S. N. (since resigned from the Navy to enter the division of Tropical Botany, U. S. Department of Agriculture) was Lieutenant Governor.—ED. PLANT WORLD.

Two bumboats from Sumay have come alongside our ship bringing bananas, coconuts, bread fruit, sweet potatoes, pineapples, lemons, limes, chickens and eggs. Pineapples are good, but not plentiful; mangos are rare, but of excellent quality, and are esteemed above all other fruits by the natives; bread fruit is in season for nearly half the year, beginning the latter part of July; oranges in October, November, December; lemons and limes all the year round. Most of the fruit brought to the ships is grown near the village of Agat. The oranges of this part of the island are not of good quality, but those grown in the vicinity of Santa Rosa, near the northern end of the island, and in the district called Yigo, are fine. Of the several varieties of sweet potatoes none are so good as those grown in the United States. The natives cultivate yams and taro, maize, rice, coffee and cacao, all of fine quality. Their only article of export is *copra*, or the dried meat of the coconut.

The bumboat man told us that deer and wild hogs are abundant on the island, and that there are wild ducks, curlew, and other water fowl. Noticed a number of noddies and gannets flying about Orote, one or two tropic birds, a frigate bird, and some white terns, but not a single gull.

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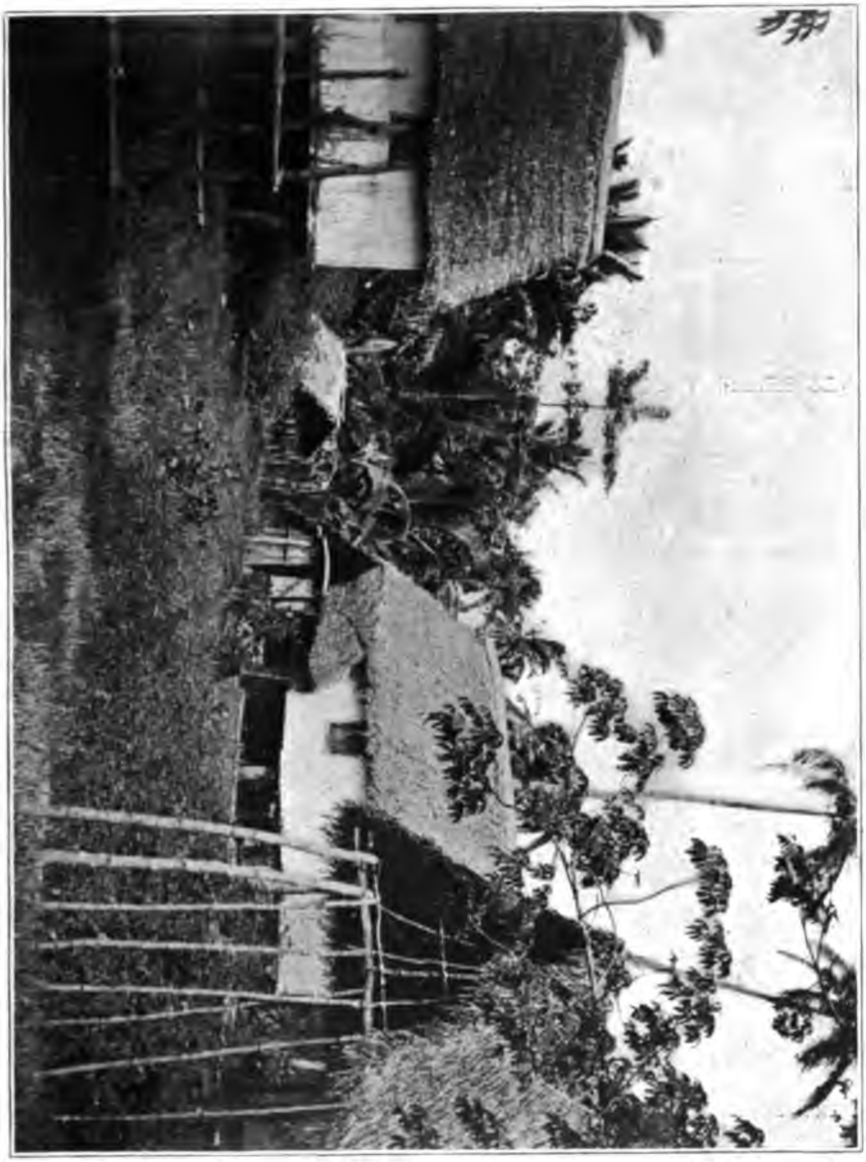
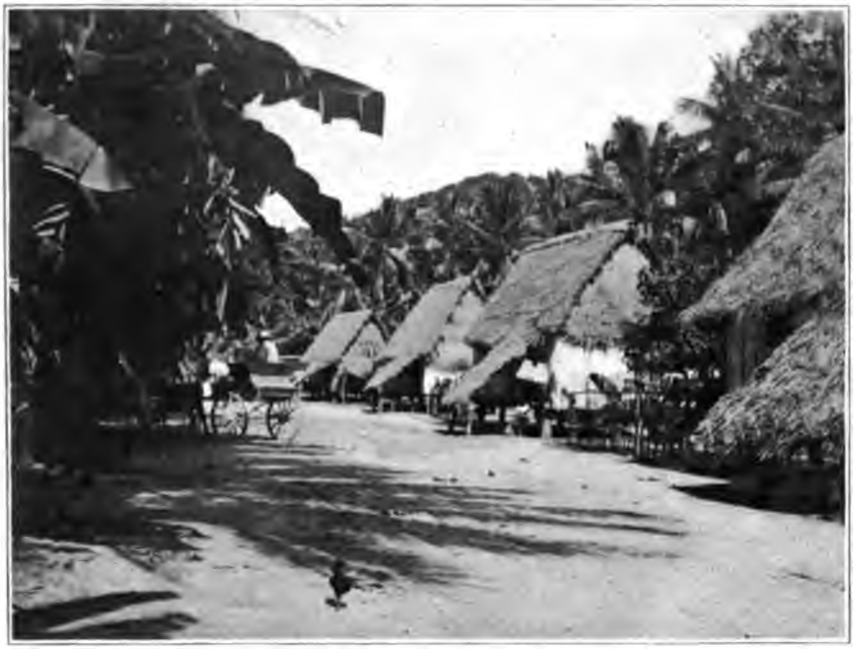
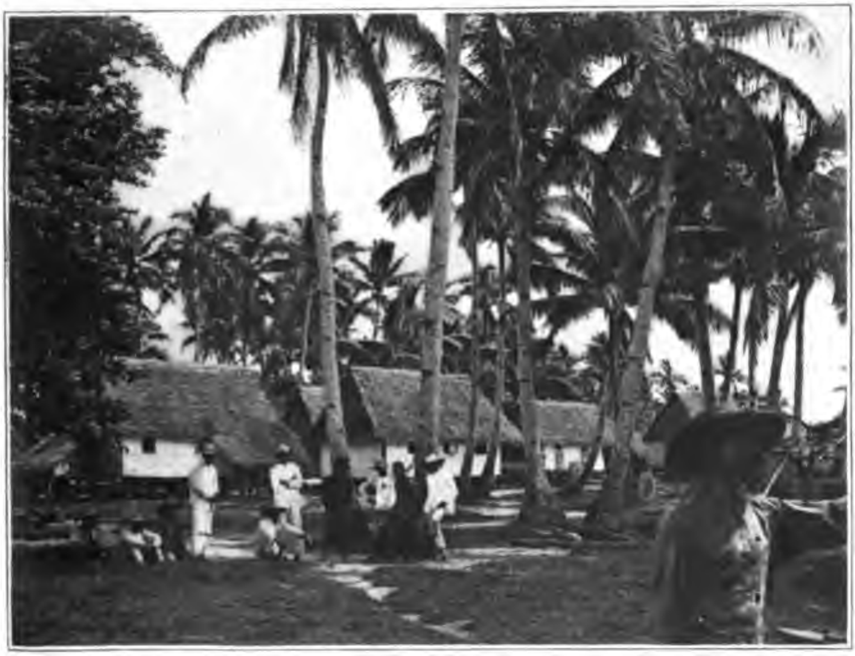
Monday, August 14.—At 8:30 to the *Yosemite* and thence ashore, a distance of nearly two miles. To the edge of the reef in the *Yosemite's* steam launch, then through the long crooked channel in a skiff rowed by two marines. Several passing showers on our way ashore; channel and coral hummocks indicated by stakes; several times the boat scraped on lumps of coral; water perfectly clear and smooth; growing coral beautiful; fishes of bright colors and strange shapes swimming about; dark colored holothurians, like great slugs, creeping on bottom; long translucent synaptas, cobalt-blue, five-armed star-fish; *Padina pavonia*, and other tropical algae. Passed close to the shore of Apapa Island. Near the water's edge "goat's-foot" convolvulus (*Ipomoea pes-caprae*), with lavender flowers and bilobed leaves; symmetrical trees with horizontal whorls of branches, glossy coriaceous leaves, and almond-shape nuts (*Terminalia catappa*), and a bush with white flowers bearing tufts of stamens and oblong capsular fruit, which proved to be *Capparis marianna*, one of the handsomest representatives of its genus.



Hut in process of construction, showing framework lashed together by means of Pandanus leaves. Silk-cotton (*Ceiba*) and Indian almond (*Terminalia*) trees in background.

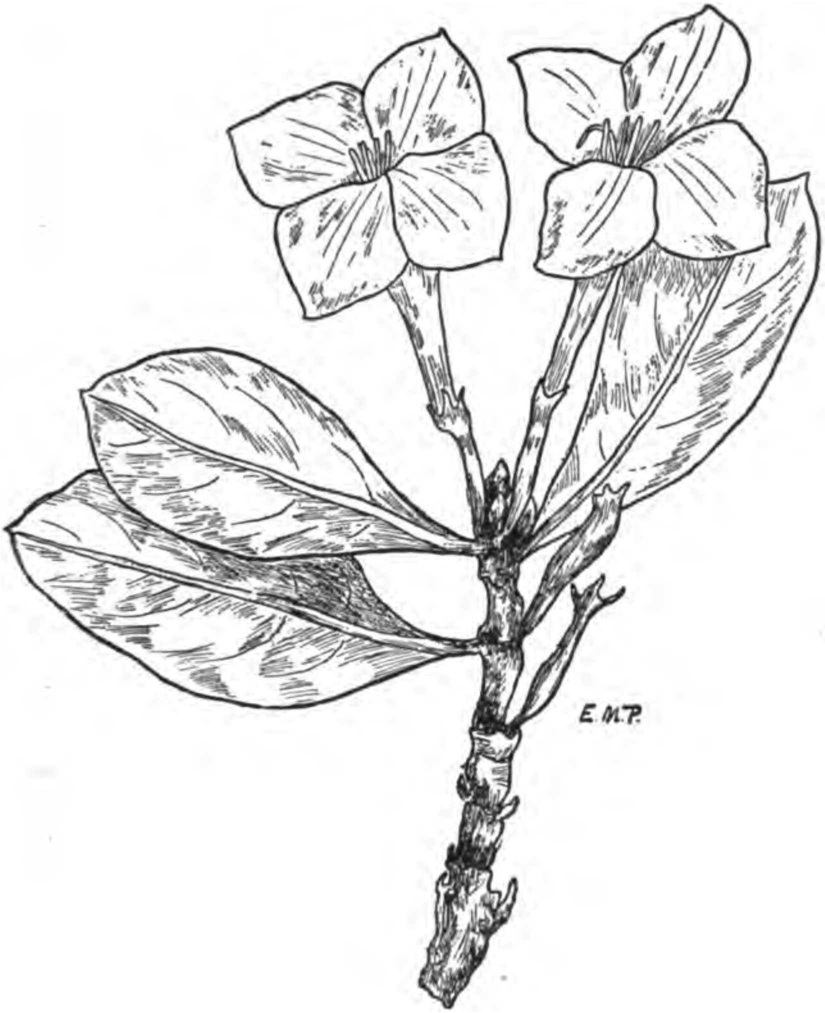


Village of Asan, on the road to Agaña, showing native carriage drawn by cow.



Typical native houses near landing place, Punta Piti.

Another shrub, or small tree, called *Gáusali* by the natives, bore white trumpet-shaped flowers, somewhat like four-parted morning-glories.



A handsome native shrub belonging to the Rubiaceae. (*Bikkia Mariannensis*).

This proved to be *Bikkia mariannensis*, a Rubiaceous plant, the wood of which is used by the natives of Guam for torches. (See figure.)

Growing among the rocks are many cycads (*Cycas circinalis*); and among the trees on the island are *Carapa moluccensis*, called "Lalanjug" by the natives, the fruit of which contains a number of closely packed, woody, angular seeds; and *Ochrocarpus obovalis*, one of the principal hard-wood trees of the island, called "Chopag" by the natives.

Landed at Punta Piti, where there is a wharf. United States flag flying from the house of the *Teniente*, which is decorated with red, white, and blue tissue paper, in honor of the arrival of the governor. At Punta Piti, several houses of masonry and a half dozen native huts of wood thatched with cocoanut leaves. Huts raised three or four feet from the ground on posts; frame work of roof lashed together with leaves of Pandanus; pigs tethered beneath them by cords attached to fore-leg; natives smiling and pleasant looking, every little chap saluting as we passed. Near the houses Terminalia and Silk-cotton trees; coconut trunks notched to facilitate climbing; native men with shirts outside of trousers.

Not far from the landing place a mangrove swamp; dense growth of *Rhizophora mucronata* and *Bruguiera gymnorhiza*, with glossy leaves and aerial, prop-like roots arching down into the mud, the former with four-parted flowers, the latter with corollas divided into many limbs; seeds germinating while fruit is still attached to tree, the radicle perforating the apex; queer little fish, like tadpoles, with bulging eyes, hopping about among the mangrove roots *(Periophthalmus Koelreuteri)*, a species of wide tropical distribution; interesting from the fact that it is air-breathing; many crabs crawling over the black slimy mud. Among the mangroves a tree with clusters of bright crimson blossoms *(Lumnitzera pedicellata* Presl.), called "Ñaña" by the natives; and, near by, a fine tree with whitish green foliage *(Heritiera littoralis)*, called "Ufa" by the natives, who make solid wheels for the bullock and buffalo carts out of its tough, cross-grained wood.

Called upon Don José Wilson, the *Teniente del Barrio*, from whom we hired a vehicle to carry us to Agaña the capital, a town of about 6,000 inhabitants, about five miles distant. Don José explained that those who had preceded us had taken the only available horses; but that we might have either a carabao or a cow. As the latter was declared to be the swifter, we selected her and were soon on our way northward, the cow trotting merrily along like a horse, her little calf following a short distance behind.* For the greater part of the way the road lay along the beach. A short distance from Piti we passed a fine rice field, the property of Don José Martinez; irrigation similar to that in the Philippines; yellow Malvaceae growing near the road (*Abutilon Indicum* and a species of *Sida*); saw several curlew and plover, and across the rice field flew a pair of wild ducks. Our driver told us of a black bird with red beak called *Pulatal*, inhabiting the rice fields and marshes—probably a gallinule, or moor-hen.

Road bordered for a short distance by *Acacia farnesiana*, an introduced species, called here as elsewhere in Spanish speaking countries, "Aroma," or "Aromo," on account of the delightful fragrance of its yellow, fluffy flowers. Accompanying it saw another shrub, called "Tangentangan" with foliage somewhat similar, but with globular heads of white flowers, which are odorless. This proved to be *Leucaena glauca;* stakes of it readily take root, so that the natives use it extensively to form enclosures for their gardens. Another hedge or fence-plant observed by us was the West Indian physic-nut *(Jatropha curcas),* here called "Tuba-tuba," an Euphorbiaceous plant I had before noticed in Samoa.

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* See figure showing vehicle with cow, left side of road, village of Asan.

Crossed mouths of several streams; bridges in fairly good condition; road generally fair, but in places a little muddy, in two places rounded promontories, passing close to sea; the road here sometimes destroyed when surf is high. On the steep side of one of these promontories a species of *Alyxia,* like the "Maile" so dear to the Hawaiians. Among the common shrubs a species of *Cestrum* with dark purple berries, called "Tintan-China" by the natives, and a plant with pretty flowers like those of a honeysuckle, belonging to the Verbenaceae *(Clerodendron inermis),* called "Lódugao." In marshy places the widely spread fern *Acrostichum aureum* and growing near the beach the sea-daffodil, in great patches *(Hymenocallis littoralis),* called "Lirio" by the natives.

Passed the leper hospital at the entrance of the village of Asan; near it a fine grove of cocoanuts. Only one leper in the hospital now; the rest scattered over the island living with their families, who apparently have little fear of contagion. Under the eaves of the natives' huts lines of bright colored crotons, variegated Acanthaceae, and other ornamental plants, planted so as to receive the drippings from the roofs; also tufts of aromatic *Andropogon,* or "lemon-grass," said to have been introduced here from the Caroline Islands.

In the small garden patches near the houses were purple fruited egg plants, scarlet capsicums, peanuts, and various aromatic herbs. Trailing over the fences, balsam pears *(Momordica charantia)* and various Leguminosae, the most striking of which was *Psophocarpus tetragonilobus,* called "Seguidillas" by the natives, having four longitudinal ruffles, or wings, along the pods; while among the trees planted by the roadside were *Erythrina Indica;* the silk cotton tree *(Ceiba pentandra); Terminalia catappa; Moringa pterygosperma* (here called "Marunggai"); and a slender leguminous tree, having very large flowers and long pods *(Sesbania grandiflora),* called here by its Philippine name "Katúray."

At the village of Anígua a number of introduced trees, including the candlenut *(Aleurites moluccana),* the Cabo-negro palm *(Arenga saccharifera),* and the *Pangium edule,* called by the Caroline Island name

"Rauwél." None of these trees have established themselves on the island. Saw some magnificent bread-fruit trees and mangoes; bread-fruit still green; mangoes not now in season.

Entering Agaña we passed under an arch of bamboo erected in honor of the arrival of the first regularly appointed American governor of Guam. Across the top were the words "WELL COME." Several streets diverging from the entrance to the town, more or less in the direction parallel to the beach and to the cliffs back of the town. Everything clean and tidy; best houses of masonry with tiled roofs, the others of frame or bamboo thatched with cocoanut leaves or Nipa palm; all of them raised from the ground. Reached the Plaza de Magallanes, upon which face the "Palace," or Government House, and other public buildings, including the "Tribunal." Behind the Palace rises the steep escarpment of a plateau on the brink of which is an old fort and powder magazine, now used as a signal station; on the west side of the plaza are the public treasury and the barracks of the native troops; on the east side the church; the palace and government store house are on the south side; and the tribunal and several private dwellings on the north side.

Inspected palace and other government buildings; raining; tiled roofs leaking in many places; much of the wood work of "Ifil" *(Afzelia bijuga)*, quite dark with conspicuous pores, like coarse mahogany with a color of black walnut; hard and heavy. Doors, floors, benches and tables of this wood; also pillars of church. In Samoa same species used for making Ava-bowls.

Chose for my quarters the rooms over the public treasury formerly occupied by the late *Administrador* of the Spanish government. These have a balcony on two sides, with sliding shutters and windows with thin translucent bivalve shells for panes. Attractive garden adjacent, overgrown and tangled vegetation; small kiosk in which there is a bath of cement and tiles. Cupboards made of wood of the fertile bread-fruit, called "Dugdug" by the natives.

Walked through the streets of Agaña to the river, where there were many women standing waist-deep in the water washing clothes. They had shallow rectangular trays of wood, which they rested on rocks, using wild oranges *(Citrus vulgaris)* for soap, and rubbing the garments with corn cobs. Many of the younger women were handsome; some were washing their long, straight, black hair with bergamots (*Citrus aurantium* var. *bergamia*), which has established itself in the island, and is quite common in the woods. This produces a lather, like soap, and makes the hair soft and fragrant. Crossed a stone bridge in the district called San Antonio, and followed along the banks of the river towards its mouth. Formerly the river proceeded directly to the sea from this point; but one of the early governors caused it to be diverted from its natural course and led it parallel to the sea shore for about a mile, so as to furnish the city with a laundry. The source of the river is a great spring about two miles inland from Agaña, called Matan-hanom. The water gushes forth in a large stream, but is soon spread out over a swamp, or "ciénaga," now overgrown with reeds (*Phragmites Roxburghii*) and *Acrostichum aureum.* Several hillocks arise from the swamp, having cocoanuts and betel palms (*Areca catechu*) growing upon them, and looking like islets in a lagoon.

On the bank of the river saw a few tamarind trees. These were introduced into the island many years ago, but unlike the bergamot, they have failed to spread themselves over the island and are only to be found where planted. Further on came to several "Aggak" trees, a species of *Pandanus*, from the leaves of which the natives braid mats, hats, and baskets. Passed some bread-fruit trees, a small grove of cocoanuts, and near the mouth of the river, a number of Nipa palms (*Nipa fruticans*), a trunkless species with giant pinnate leaves rising from the water's edge, and clusters of fruit at their base. These were introduced from the Philippines for the sake of the thatch made from their leaflets. Acres of sand near the sea covered with sea-daffodils. Near the water's edge found *Sesuvium portulacastrum* associated with the widely spread goatsfoot convolvulus.

On our way back saw natives sawing boards out of logs of *Afzelia*, and "Dugdug," or fertile bread-fruit wood; others tanning skins of cattle and deer. A man engaged in tanning told us that the best tanbark on the island is gotten from *Pithecolobium dulce*, a tree of Mexican or Central American origin, now widely spread in the East.

Old woman came out of native house offering us a glass of *tuba*, as the sap obtained from the flower-spadix of the cocoanut is called. This very much like cider just beginning to ferment. The tips of the spadix branches are sliced afresh each morning. They are tied in a bundle, and bleed into a bamboo joint hung to receive the sap. Care must be taken to clean the bamboo vessel each day, as putrifying insects give to the tuba a bad taste. In four hours the tuba becomes pretty sour. The natives distil it into a drink called *aguardiente*, which is very intoxicating. Stopped at a distillery on the river's edge to taste some *aguardiente*, but found it inferior in taste to Mexican *mezcal.*

Made arrangements with Henry Mellinchamp, the pilot, to take my meals with him at forty pesos ($20.00) a month. Met his wife, Doña Emilia Anderson, who is said to be the most attractive and witty matron of Agaña. She is the grand-daughter of John Anderson, a Scotchman, who settled in Guam about 1819, and served the government as pilot and interpreter for years. The eldest daughter of Henry and Doña Emilia is the wife of Captain Pedro Duarte, of the Spanish Army, who served as military aid to the late Spanish governor of Guam. Don Pedro is about to resign his commission in order to remain on the island with his wife and little ones.

Back to the ship for the night.

[TO BE CONTINUED.]

FRANK HALL KNOWLTON, M. S., Ph. D.

By CHARLES LOUIS POLLARD.*

DURING the five years that have elapsed since the foundation of THE PLANT WORLD there have been changes both in the editorial staff and in the business management. That the journal has, however, kept its general policy unaltered throughout this period is due to the practical judgment and sagacity of the man who initiated the idea of a magazine of popular botany, who later secured the assistance necessary to carry the project into effect, and who has since served as editor-in-chief of the journal thus established—Dr. Frank H. Knowlton.

In common with many of the scientists at the National Capital, Mr. Knowlton can boast of a long line of New England ancestry. He was born in Brandon, Vermont, in 1860, and spent the early years of his life on his father's farm, ultimately preparing himself for Middlebury College, which he entered in 1880. Like most boys he evinced a taste for natural history, which became stronger and full of definite purpose as his education advanced. He began to make a collection of plants of the vicinity of Brandon, and accumulated a small herbarium, which ultimately passed into the collection of the U. S. National Museum, at that time kept distinct from the herbarium of the Department of Agriculture. Mr. Knowlton also did much work in ornithology at this period, though he had less opportunity of forming a collection of birds.

Being graduated from Middlebury College, with the degree of B. S., in 1884, he received an appointment as Aid in the National Museum at Washington, and thus took up the career of a professional botanist. During the succeeding five years he cared for the museum collections, being promoted, in 1887, to an assistant curatorship, and receiving the additional degree of M. S. from his home college. Dr. George Vasey was at that time botanist of the Department of Agriculture; and Mr.

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*The portrait of Dr. Knowlton, which we had hoped to present with this issue, could not be prepared in season, and will therefore be included in a later number.—PUB. PLANT WORLD.

Knowlton was associated in the museum with Professor Lester F. Ward, Mr. Theo. Holm and Mr. Gerald McCarthy.

In college Mr. Knowlton had given almost equal attention to botany and geology, and his knowledge of the latter subject resulted in a slight change in his work toward the close of the decade. Some botanist was needed in the museum to care for and make identification of the fossil plant collections that began to arrive in constantly increasing numbers. Hence in 1889, Mr. Knowlton became assistant palaeontologist in the museum, and carried on work in this branch of science for several years. Ultimately he was transferred to the U. S. Geological Survey, with the title of palaeontologist, a position which he still holds. His office remains at the scene of his old labors in the museum, as the collections belonging to the Survey, on which Dr. Knowlton is constantly at work, are all stored in the Museum building.

His connection with the study of living plants, after he became a palaeontologist, was maintained through the professorship of botany at Columbian University, in Washington, which he held from 1887 to 1896, being honored in the latter year with the doctorate of philosophy by that institution. Ultimately, finding that his classes required too much time and labor, in addition to his regular office work, he resigned from the university, and has since devoted himself to literary work.

Dr. Knowlton's experience in writing definitions in botany, first as an assistant to Prof. Ward, on the Century Dictionary, later in connection with the Standard, where he had full charge of the subject, and more recently as writer of the definitions in structural and cryptogamic botany for the Supplement of Webster's International, has contributed very materially toward his success as a writer and editor. For many years he advocated the establishment of a journal which should present the facts of plant life in language intelligible to everyone, but all his efforts to interest others in the establishment of such a journal were in vain. The "Asa Gray Bulletin," as the organ of a Chapter of the Agassiz Association, came into existence in 1893, but it was at first a small amateur sheet, appearing at long intervals. "The Fern Bulletin," a little magazine, similarly the organ of a body of students, was devoted exclusively to ferns. Thus the field was practically clear for a magazine of wide scope, and just at the time of the great awakening of interest in nature study, five years ago, it became possible for Dr. Knowlton, through the kindly coöperation of Dr. N. L. Britton, of the New York Botanical Garden, to carry his long cherished plan into effect.

The first number of THE PLANT WORLD appeared in September, 1902, with Dr. Knowlton as editor-in-chief, and Willard N. Clute as business manager and publisher. A board of associate editors consisting of Mrs. N. L. Britton, Miss Clara E. Cummings, Dr. Walter Hough, Dr. A. W. Evans and Mr. Charles L. Pollard, acted in an advisory capacity. The subsequent history of the journal is well known to its friends and subscribers.

Dr. Knowlton struck the key-note of his policy at the outset by refusing to publish, under any consideration, technical descriptions of new species or articles on topics of purely scientific interest; he adopted the wise policy of permitting each author to follow his own preferences, without correction, but advocated the use of English names as much as possible. He has always believed in the theory that readers of the journal are entitled to the best and most accurate information on all subjects, and has therefor labored unceasingly to secure the gift of articles from prominent botanists throughout the country, wisely considering that much of the stuff sheltered under the mantle of popular science is unworthy of consideration. In these opinions he has always been sustained by his associates, and it is indeed the best possible testimonial to the soundness of his editorial judgment that the policy of the journal has remained the same under the different managements through which it has passed.

The writer's acquaintance with Dr. Knowlton is of eight years' standing. When THE PLANT WORLD was established an intimate personal friendship rapidly grew up, which has led to our association in many literary and other ventures. It is a pleasure to record the fact that through these years no single misunderstanding has ever occurred to mar this friendship. As a companion, Dr. Knowlton is attractive through his interest in men and affairs, and he is thoroughly well-informed on many subjects. He has a keen sense of humor, which some of his editorial experiences tend to develop, and he is an entertaining raconteur.

Dr. Knowlton's principal literary works, other than the innumerable short articles that he has published in various magazines, are the following, which have appeared through the U. S. Geological Survey: "Fossil Flora of the Yellowstone National Park;" "A Catalogue of the Cretaceous and Tertiary Plants of North America;" "Fossil Wood and Lignite of the Potomac Formation," and "Fossil Flora of Alaska." His name has been commemorated in connection with a rare tree, the hop-hornbeam of Arizona, *Ostrya Knowltoni;* a moss, *Bryum Knowltoni*, and many fossil plants have also been dedicated to him.

At his charming home in Laurel, Maryland, he spends much of his leisure time in his garden and greenhouse, where he has quite an assortment of plants. In past years he has made several field trips to the West, from which he has brought valuable collections.

A DECIDUOUS TROPICAL TREE.

By O. F. Cook.

THAT the trees of temperate regions lose their leaves in the winter, while those of the tropics are evergreen, affords one of the most striking contrasts between the two zones. The tropics with their perennial verdure are commonly thought of as the headquarters of the vegetable kingdom, since the temperate regions are open only to the species able to withstand frost. With many herbaceous plants only the seeds are resistent, in others the underground parts are protected by the soil. Still other temperate herbs are dependent upon a covering of snow. Shrubs and trees, however, must endure all climatic extremes. At the northern limit of the range of a species great advantage is enjoyed by a tree more hardy than its fellows, and the deciduous habit has accordingly been interpreted as an indubitable instance of a characteristic attained by natural selection, that is, our temperate trees are held to have become deciduous because of frosts which killed all non-resistent individuals. Interpreted into a general proposition, this is taken to mean that changes in the characters of organisms are due to their environment.

Darwin and the earlier evolutionists were accustomed to think of variations as being extremely small or almost imperceptible; but we now know that they are very frequently considerable, so that the line of advantage or disadvantage may easily be crossed in a single generation. In other words, plants or animals move of themselves much more actively than has been supposed under the theory that such changes took place only when imperceptible differences were accumulated through the close sifting of natural selection. Too great confidence in the supposition that the deciduous habit has been attained only through selection in temperate regions has led many to the belief that the relatively few deciduous trees of the tropics are descended from temperate ancestors, and it is indeed a most striking reminiscence of our northern autumnal season to see a giant silk-cotton or other Bombacaceous tree standing leafless in a full-foliaged tropical forest. It has been supposed that the time passed in this inactive condition is wasted, and that such a disadvantageous habit can be explained only on climatic grounds. The interruption of growth is not, however, confined to temperate regions nor to deciduous trees. In fact, the vast majority of plants and animals, tropical as well as temperate, have alternating periods of rest and vigorous growth. The falling of the old crop of leaves may be a mere incidental of such a process. Among the numerous native species of figs of the interior of Guatemala some are completely deciduous in the dry season, while in others the full vigor of the leaves is retained.

In Java a fig studied by Mr. D. G. Fairchild dropped its leaves completely and put out an entire new set within a few days. With this species the reasons for the leaf-fall seemed to be physiological and internal; no connection with the seasons was apparent. Similar differences exist among temperate trees, the structure of some of which insures the prompt falling of the leaves in autumn, while others may hold the dead and useless leaves till spring.

Tropical trees may be said, therefore, to furnish a beginning from which the deciduous habit could readily be developed with the encouragement, first of dry seasons and then of frosts. It is now known that the injuries of frost are not due alone to the direct effects of the cold upon the protoplasm, but to the loss of water, which constitutes so large a percentage of living matter. Experience in deserts or in regions with long dry seasons would thus be an important preliminary to enable trees to exist in temperate regions. The forests of the arid interior of Guatemala and Mexico contain many trees deciduous in the dry season and for these entrance to higher altitudes or latitudes would be relatively easy. Such a transition would also be further facilitated by the fact that in this part of the world the dry season comes in winter, while if the rainy season of active growth came in winter, as in some parts of the world, the opportunities for extension into colder localities would be greatly lessened.

It may be held, therefore, that the existance of deciduous trees is not to be explained through simple selection by frost, but is rather a specialization and extension of the alternations of active growth and rest normally existing in plants.

In the moist tropics it might be said to be an advantage for a tree to hold its leaves even in a period when it does not use them, since to let them fall would be to encourage the growth of competing vegetation, but even here there may be special causes favoring the deciduous habit. Such an instance was recently noted in the forest-covered region of Eastern Guatemala. Along the Rio Dulce and the Golfete there is a magnificent Bignonaceous tree with peach-blow flowers, borne in enormous profusion when the leaves are entirely wanting. The result is a mass of color visible for a distance much greater than would be possible if leaves were intermixed, and thus much better able to attract the attention of humming birds and other insectivorous species which visit the flowers. Cross-fertilization is thus secured from much greater distances than would be provided by short-sighted insects, and a variation in the direction of dropping the leaves would have a great advantage in becoming widely spread. In such a case natural selection might be said to take place between variations rather than between individual plants. Trees which dropped their leaves might have been no more fit to survive in the sense of having any greater efficiency in the struggle for existence, but an increasing number of their offspring would have the new character until it became universal in the species, or, in the event of the existence of geographical or other barriers to cross-fertilization, until two species had been formed, the one with, and the other without, the habit of dropping the leaves at the time of flowering.

OUR VANISHING WILD FLOWERS.

By L. H. Pammel.

(With five full-page plates.)*

During the early days the Iowa prairies were covered with a large number of native plants. It was a succession of bloom from early spring to late autumn. The wild prairies are now in most sections of the State a thing of the past. There are only small areas left in the State where the original flora still remains in its primeval condition. These areas are confined to the right of way of the railroads, along roadsides, or on fields, where the ground is too moist most seasons for the successful cultivation of agricultural crops. The roadsides now offer the best opportunities in most sections of the State to obtain the native plants.

Of course, there are some protected localities. As an illustration the flora of the bluffs along the Missouri are more favorable for the preservation of the native flora, as the bluffs are too steep for cultivation. Here one may find great masses of *Oxytropis Lambertii*, *Pentstemon grandiflora*, *Mentzelia ornata* and occasionally *Yucca angustifolia*. Another important factor in destroying our original wild plants is the hard usage that our timber is receiving by over grazing. The farmer who has 160 acres of land utilizes all of the land he can. All of the good tillable land is used for farm crops, and the remainder when somewhat rough is pastured. In place of having a good mulch for the support of the tender plants, these woods are covered with a carpet of blue grass to the detriment of these plants, and generally to the detriment of the forest growth. A few illustrations may be cited: At one time the large white lady-slipper (*Cypripedium spectabile*) occurred on the moist banks in oak woods in the vicinity of Ames. I have not seen the species since 1890, although I have looked for it. The small white lady-slipper (*C. candidum*) was common in the marshes surrounding the many swamps in Central and Northern Iowa. It has, however, became a rare plant. A small patch was found a few miles west of Ames in the spring of 1901. It is still common in Northern Iowa. The yellow lady-slipper (*Cypripedium pubescens*) was not infrequent in our moist woods some ten and fifteen years ago. Now, however, it is quite rare. The writer has found only a half dozen specimens during the last half dozen years. *Lilium Philadelphicum* formerly was abundant everywhere in the low meadows. While it is not a rare plant now, many of the former localities have disappeared. *Lilium Canadense* is growing scarcer every year. In the marshes of Northern Iowa this plant was once common. It is a rare plant in the vicinity of Ames, though more common in the glacial basin further north.

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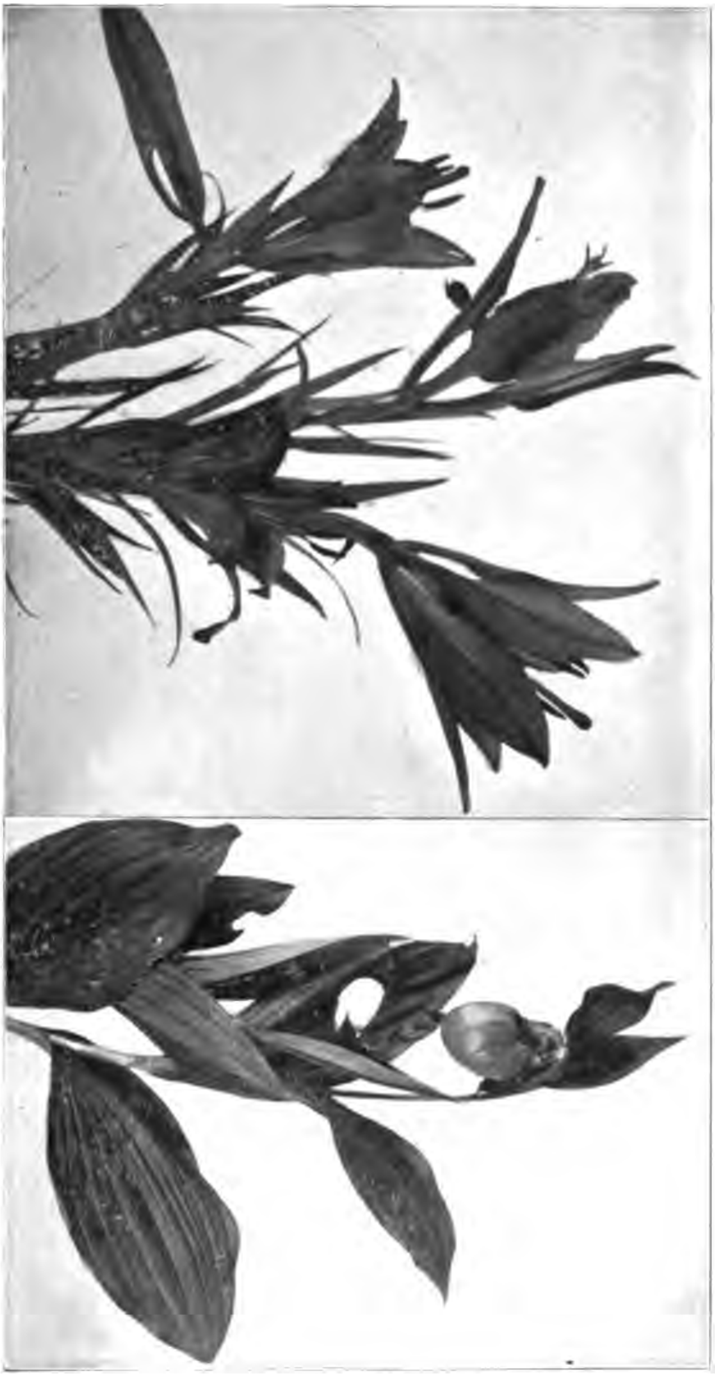
* For the use of the half-tones accompanying this article we are indebted to the courtesy of the author.—Ed. Plant World.

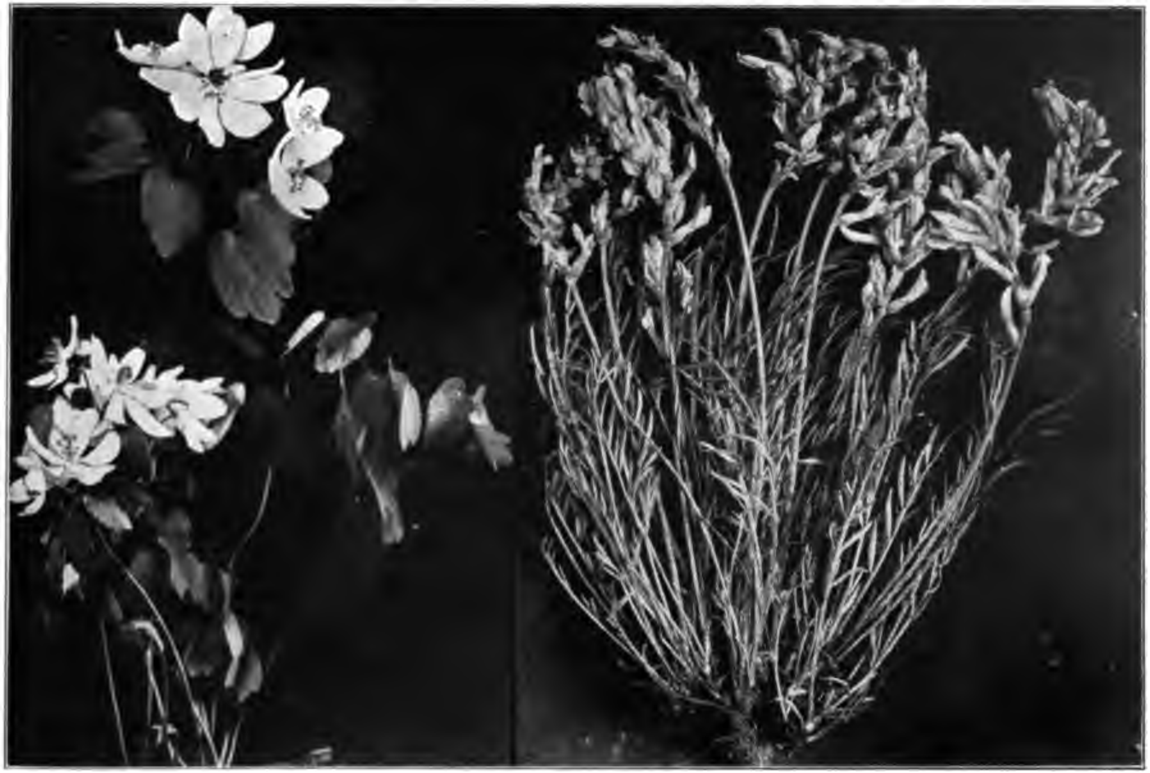
The *Habenaria leucophaea*, once common around Ames, has become a rare plant. The large marshes where this plant grew have been drained to a considerable extent; add to this a series of dry years and it is easy to see how many delicate wild plants must disappear. The *Caltha palustris* and *Salix rostrata* are plants that love wet spongy places. They are rapidly disappearing. Ten years ago the *Gentiana crinita* occurred in a small bog on the College farm close to a spring. The dry years 1894 and following seasons made the peaty soil around the spring so dry that it might have burned. The plant has not been found since. *Draba Caroliniana* was found in a few localities on the dry sterile hills. The close pasturing has removed all traces of this plant. It was found in an unaccountable place on sandy ledges in Hardie county.

The small *Anemone Caroliniana* and the Pasque-flower were found by the writer on gravelly drift a few miles from Ames, in 1899. I have been to this locality every spring since, but all traces of these plants have disappeared. The *Anemone patens* or *nuttalliana* is, however, common in Northern Iowa, and occurs at a few other stations about Ames. The *Anemonella thalictroides* was frequent in all of our woods; last spring the writer found few of these plants remaining in the pastured woods about Ames. It was common, however, in protected woods. The *Hepatica acutiloba* and *Claytonia Virginica* still flourish in woods where there is plenty of leaf mould, and where blue grass has not crowded them out. The *Heracleum lanatum*, once common in all of our rich woods, is disappearing except where they are not pastured. So, too, the *Thalictrum dioicum*.

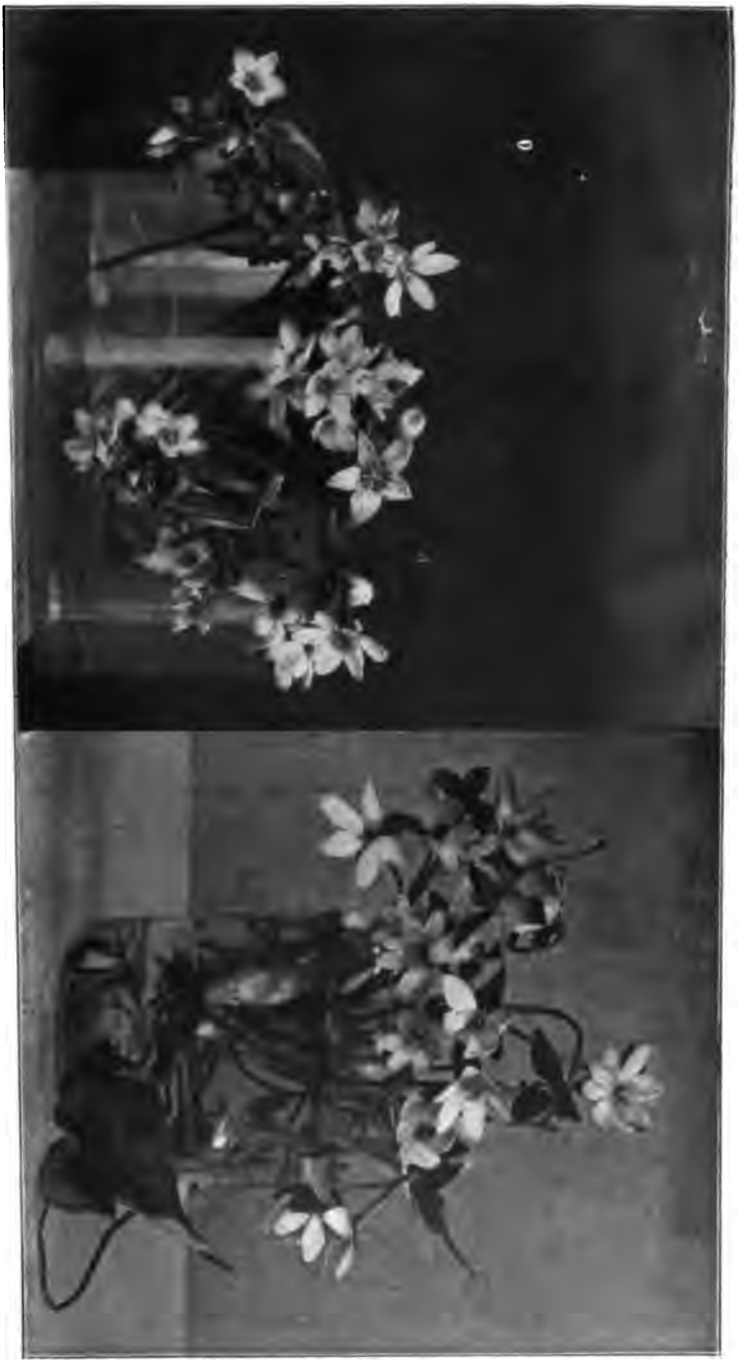
In Central Iowa, not far from Steamboat Rock, there still exists a unique collection of wild plants, perhaps not very different from what it has been for ages. A carboniferous sandstone ledge occurs on the banks of the Iowa river. Here may be found *Pinus Strobus*, *Betula lenta*, *B. papyrifera*, *Aspidium spinulosum*, *A. marginale*, *Phegopteris Dryopteris*, *Polypodium vulgare*, *Cystopteris bulbifera*, *C. fragilis*, *Woodsia obtusa*, *Lycopodium lucidulum*, *Cornus asperifolia*, *Diervilla trifida*, *Cypripedium pubescens*, and other boreal plants. The shade of the dense growth of trees and moisture keeps the soil in good condition for the growth of



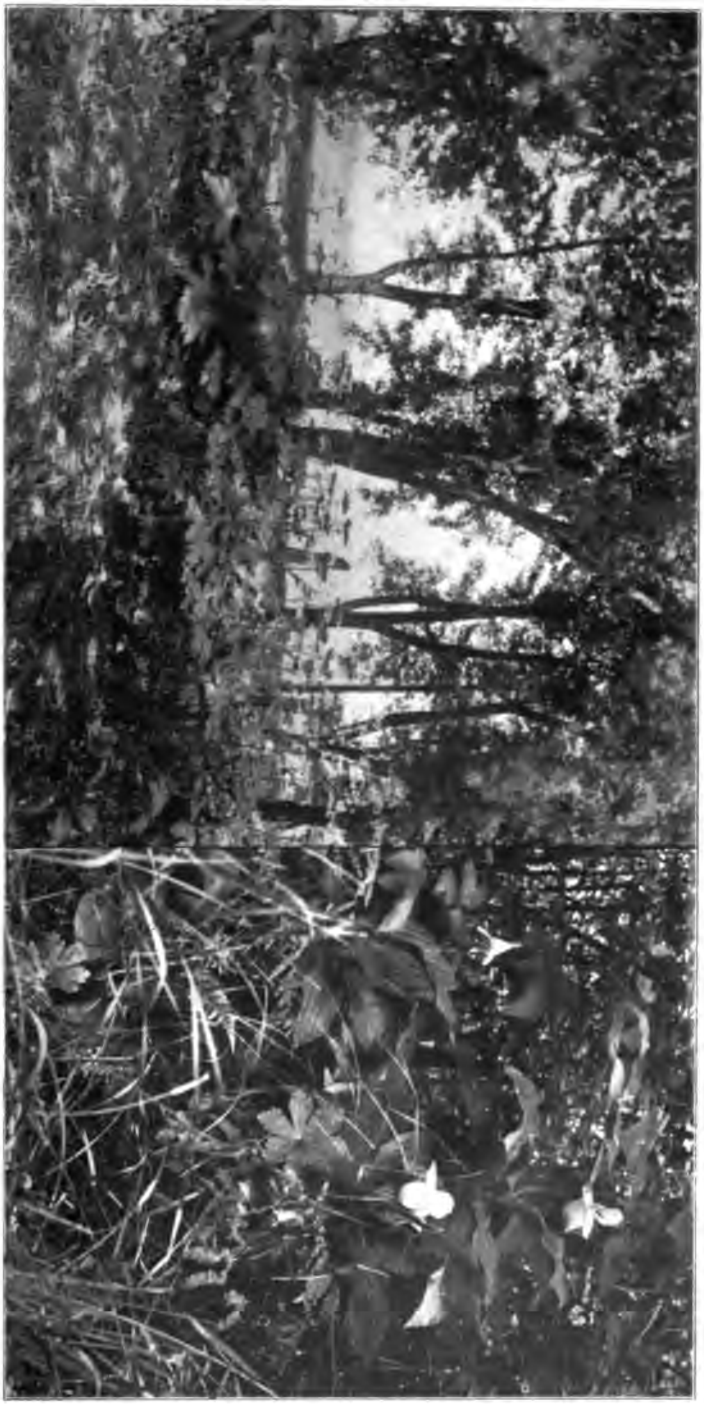
On the right, the large Yellow and Small White Lady's Slippers *Cypripedium hirsutum* and *C. candidum*; on the left the wood lily (*Lilium Philadelphicum*).



On the right, the stemless loco-weed (*Aragallus Lamberti*); on the left the rue-anemone (*Syndesmon thalictroides*).



Spring beauty and Hepatica.



On the right, the white Lady's slipper (*Cypripedium reginae*) in a tamarack bog; on the right, Cow Parsnips (*Heracleum lanatum*).

these shade-loving plants. The *Betula lenta, Diervilla trifida* and *Pinus Strobus* are much beyond their usual range. If this patch of woods were not protected by a fence and the broken detritus of rocks, these stations would soon disappear.

THE ETYMOLOGY OF COLUMBINE.

BY E. J. HILL.

IN some former issues of the THE PLANT WORLD (July, 1900, February 1901), this subject was discussed. In the first article, by C. F. Saunders, objection was made to the etymology commonly found in standard English dictionaries, where it is based on the resemblance of the nectaries or spurred petals to a ring of pigeons around a dish, a common device of ancient artists. A deviation from the Latin noun *columbarium*, a dove-cote, was suggested, because, as he views them, the five round openings, or mouths of the funnel-shaped petals, resemble a dove-cote. The second article, by Dr. E. L. Greene, gives the etymology generally acknowledged from the Latin adjective, *columbinus*, "pertaining to doves or pigeons." But an application to the dove's foot rather than to its head and neck is preferred, analogous to the deviation of *Aquilegia* from *aquila*, the eagle, the petals being curved at the end like the claws of that bird. Reference is made to *Pes columbinus*, or dove's-foot, the name of a geranium among old authors, which Linnaeus has preserved in *Geranium columbinum*, a plant of Europe and Northern Asia. It is suggested that some pre-Linnaean writer may have applied this name to the columbine, in allusion to the curved or claw-like petals.

The etymology is one that seems to rest on the history and use of the term. No reference being made of such use of the noun *columbarium*, it may remain, as given, a suggestion of Mr. Saunders. In the Portuguese tongue there is one which favors the statement of Dr. Greene, in which *Pes columbinas* is a name of the *herva aquilegia*, (herb Aquilegia). But as far as opportunity has permitted the examination of pre-Linnaean writers on botany, no such use of *Pes columbinus* has been found. A very strong clue to the extent of its use may be seen in the Pinax Theatri Botanici of Caspar Bauhin. It was published at Basel, in 1623, and shows a very careful survey of the literature of botany down to his time, so that it has remained a classic in its way. It is a list or index of plant names and their synonyms found in the ancient classical and modern writers upon botany previous to his era, and comprises about six thousand names of plants. There is no citation of *Pes columbinus* used for any plant except the geranium, chiefly, as Bauhin groups them, the mallow-leaved geranium (*Geranium malvaefolium*). The *Pes colum-*

binus of Dodonaeus, Caesalpinus and other writers, is made the equivalent of "*Geranium columbinum*" of Tabernaemontanus and Gerarde, and the "*Geranium malvacearum sive balsaminum*" of Camerarius. It was a geranium with deeply divided leaves, the dove's-foot cranesbill of English authors. Bauhin, however, gives *Columbina* as a synonym of *Aquilegia*, referring it to the wild or wood columbine of Europe, called by him "*Aquilegia sylvestris*," a plant with simple, blue or purplish flowers, plainly the *Aquilegia vulgaris* L.

The word evidently came into the English through the Romanic languages, being in use in Italian and French, with several meanings as noun or adjective, besides its application to the plant. One of these was dove-colored, harmonizing with a common use by Latin authors, especially by Pliny. The color referred particularly to the dove's neck, and in this sense was also applied to the plant. In Hatzfeldt and Darmestéter's General Dictionary of the French Language, *colombin* is given as a word derived from the Latin *columbinus*, with the definition, "Old adjective; having the color of a dove's neck." A still older form is *columbain*. In Italian it became *colombino*.

The popular name of *Aquilegia* in French is *ancolie*, but among others for *Aquilegia vulgaris*, at least, is *colombine*, the spelling, as in Italian, conforming more closely to that of the Romance tongues. In Baillon's Dictionaire de Botanigue we have "*Colombina*, name of the *ancolie* at the time of the Renaissance." There is no reference to a definite writer of the Renaissance period, but the name is carried back to that epoch in the form employed by Caesalpinus and Bauhin. Confirmatory of this is a remark of Fabius Columna, in his account of *Aquilegia*, to the effect that *columbina* was used by the "*neoterici*," or modern writers, as a name of "*Aquilegia sylvestris*." This occurs in his "Phytobasanos," or "History of some Ancient Plants," which was published at Naples, 1592.* Skeat (Etymological Dictionary of the English Language) refers to Wright's Vocabulary for the English form of the word: "*Columbina*, low Latin, a *columbyne*," and to Cotgreve's French and English Dictionary (London, 1660): "Old French, *colombin*, the herbe *colombine*," and also with the meaning "dove-colored." The oldest reference in Murray's New English Dictionary on Historical Principals, is dated 1310, in a quotation from an edition of Lyric Poems, edited by Wright, with the same spelling as now used. It thus appeared in English during the period of Middle English, presumably from the French, and with this application to the plant *Aquilegia* or *Columbine*.

In view of such interpretations and uses of the word by Italian,

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*I quote from the edition of Planeo, Milan, 1744, in which *Aquilegia sylvestris*, so-called by Columna, is the first plant figured and described, with a reference; "C. P. B., (Caspar Bauhin's Pinax), p. 144."

French and English writers, by Latin authors of Renaissance times, including those Columna calls "*neoterici*," it may be asked how the older botanical writers explained the application of the name to the plant, and how well they agree with the explanations commonly given in standard English dictionaries. A couple of examples may be taken: In the Imperial Dictionary, "The common columbine is a favorite garden flower, which owes its name to the fancied resemblance of five spurred petals to the form of pigeons." That of Dr. Murray's New English Dictionary is: "Common columbine, the inverted flower of which has some resemblance to five pigeons clustered together." Probably the word was of popular origin, like our bishop's-cap, pitcher-plant, Dutchman's-breeches, and the like, in which a fancied resemblance is traced.

One of the best explanations of the name by the older writers is that of John Ray.* In connection with the etymology of *Aquilegia*, he writes: "This is a modern name, as it were, *aquilina*, because the hooked points of the flower are like the claws of an eagle. In English it is called *columbine*, because the recurved spurs of the flower resemble the neck of doves, along with their head and beak, both in form and color." When describing the common columbine (*A. vulgaris*), which grew wild in England, he further states: "The slender though stiff, hairy, geniculate, branching stems bear delightful flowers, made up of little rostrate horns, which by an excellent device of nature resemble doves with their wings outspread, if each of the little horns with the two leaves (sepals) by its sides be taken separately." A century before the time of Ray, a similar explanation was made by Dalechamps, a botanist and physician of Lyons. "The flowers consist of two kinds of leaves, five small and narrow radiating like a star, and five with openings below, hollow and funnel-shaped like those of the larkspur. These are bent at the tip, and in slenderness resemble the neck and beaks of doves. Hence the name, columbine. This is to be understood of the simple flower,"† that is, as compared with *florae plenae*, or double flowers, common in gardens, in which the appearance would be disguised.

The resemblance is not hard to trace in the flowers, as they hang on the stems in their inverted position, making each sepal do double duty; there is a ring of five little birds resting on some concealed circular perch, their beaks pointing inward. The colors mentioned by Ray are readily matched with some of those found among doves, since in both single and double flowered varieties in cultivation at that time several colors are given. A dozen shades at least are named by him.

CHICAGO, ILL.

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*Historia Plantarum, 1, 705, 1686.

†Historia generalis Plantarum, Lugdunum, 1587, p. 820.

ORIGIN OF PLANT NAMES.

By Grace Stoddard Niles.

I. HISTORY – Continued.

Among some of the terms applied to the parts of a plant may be cited *acinus*, denoting the whole fruit of the grape, juice, grains and stones. *Vinaceis* denotes the outer skin, while *racemus* is used to designate a bunch of grapes, or a cluster of fruit of other vines. *Radix* becomes root, applied to the lower part of a shrub or plant, *Caudex* becomes stem, and is that part of a tree or plant rising above the soil or roots. *Folium* becomes leaf, and clothes or adorns a tree or plant; *flos* becomes flower, not clearly defined, but includes the *perianth* of a flower entire. *Corolla* becomes the flower's petals, and *calyx*, sepals, is the outer cup or sheath inclosing the blossoms of trees or plants. The *stamina* and *apices*, signifying anthers and pistils, were not fully understood by him, and he remarked that they "arise like threads from the herb's depth of the blossom within the *calyx*." *Julus* became catkin and is that part of the flower hanging down, as in the walnut, mapel, mulberry, beech and chestnut trees. *Fructus* becomes fruit, or ovary and ovules. Thus originated the names of the structural parts of plants in part.

The use of dried plants for study was advocated by Luca Chini, and his pupils, Aldrovandi and Cesalpino, directors of the garden at Bologna, are said to have formed the *first herbaria*, in the modern sense of the term. The name "*herbarium*," however, before the sixteenth century denoted a book of plants instead of dried or pressed specimens of living species. Tournefest, as late as 1719, called his work "*Institutiones Res Herbareae*," a book of plants. One of the first extant *herbariua* of dried species was formed by Ratzenberger in 1559, discovered in the museum at Cassel, and described by Kessler.

Mathias Lobelius, in 1576, and Dr. Rembert Dodoens, 1555–1578, approached a natural system with order of arrangement of species, and although neither produced such an order, they appear to have been guided by instinct for natural affinity of forms of leaves and flowers, and associated unconsciously several species and genera according to the law of nature and habitat. Caspar Bauhin about this time also was working upon the classification of plants and their nomenclature. His researches may well be considered scientific in the sense of the word. In his "*Prodromus Theatri Botanici*," 1620, he noticed *all* parts of a plant with all possible briefness and order. Every plant with him has a generic and specific name, especially in his "*Pinax*." Although a third or fourth auxiliary may be observed to the second or specific designation, in part explaining size, color or habitat; as for instance

Helleborine Calceolus Canadensis, flore luteo minore, or *majore,* as the case might be. This explained in English becomes literally—Bastard Hellebore with a round small or large yellow flower, found in Canada. Bauhin worked forty years upon his "*Pinax,*" in order thus to show how each one of the species given by him was named by earlier botanists.

Dioscorides and Pliny attached whole rows of names to a single plant, and authors in Fuchs' and Dodoen's day aimed to cite all known synonyms of species, attaching the names of ancient authors to their lists also. Caspar Bauhin sought to put an end to the uncertainty of nomenclature in his "*Pinax,*" and therefore it became an exhaustive list of synonyms, and though three centuries old is still valuable to-day for the history of individual species.

Bauhin developed his researches from the former ideas of Fuchs and Bock before him. Although the actual honor of botanical classification and binominal nomenclature, that is, the two-name system, adopting *one* generic and *one* specific designation, is accredited to Linnæus in 1753. We must justly observe that no *one* botanist or immediate century can be said to have established the two-named system or the terminology of parts of the flower. It was a process of evolution, slowly brought about by increased civilization and cultivation, and inventions due to modern education.

Botany well may be said to have become a science in the hands of Linnæus in 1700, since he laid down scientific rules, and his first edition of Species Plantarum, 1753, becomes the starting point from which modern botany dates the true origin of both generic and specific names for all time.

Professor Sachs has said that "investigation of nature consists not only in deducing rules from exact and comparative observations of the phenomena of nature, but in discovering the genetic forces from which the causal connection, cause and effect may be derived. There has been much twisting and turning of facts in the history of botany, and according to the scholastic methods in playing with abstract conceptions, the best player is he who can so combine them that the real contradictions are skillfully concealed." Linnæus, therefore, became the "best player" in the contest, and has won a high place in the history of the science. He absorbed *all* that seemed best and soundest in the doctrine of past ages, and became the first botanist who truly and intelligently established natural groups in his "Fragment" published 1738, when he gave the diagnosis of sixty-five groups founded on the law of natural affinity, which are recognized to-day in part.

From 1753 to 1850, the natural system became an established law. Much credit is due to Bernard de Jussieu and his nephew, Laurent de Jussieu, in 1759, and combined later with DeCandolle's and Robert

Brown's researches in 1800–1831, we mark the crises in the history of botany.

The advance of the invention of the microscope in 1830 until 1850, produced still a clearer insight into the processes of fertilization of plants, and increased the knowledge of the processes of evolution and the continuance of future generations of the species.

Sex in plant life became established in the year 1845 to 1846. Darwin's researches, in 1859, led to his great work, "The Origin of Species," and he proved that the constancy of species was no longer an open question. Clearness at last became established in place of superstitious obscurity observed in the ancient belief of Theophrastus and Pliny.

Mosses and fungi are no longer considered the "children of the gods," dropped mysteriously from the heavens, since they appeared not to produce seed or spores visible to the casual observer. Progressive education and the inventions of magnifying agencies have established scientific truths in place of oracular and mystified theories!

The nineteenth century closes, therefore, with having established much for the science and gives auguries for future research. The revision of botanical nomenclature from 1896–1900, whereby a fixed initial date, 1753, was adopted for all generic and specific designations, according to the moral rule of priority, has become established in part. That is, that the oldest published name in conformity with the natural system shall be the *legal* name so long as it dates no further back than the first edition of Linnæus' Species Plantarum, 1753.

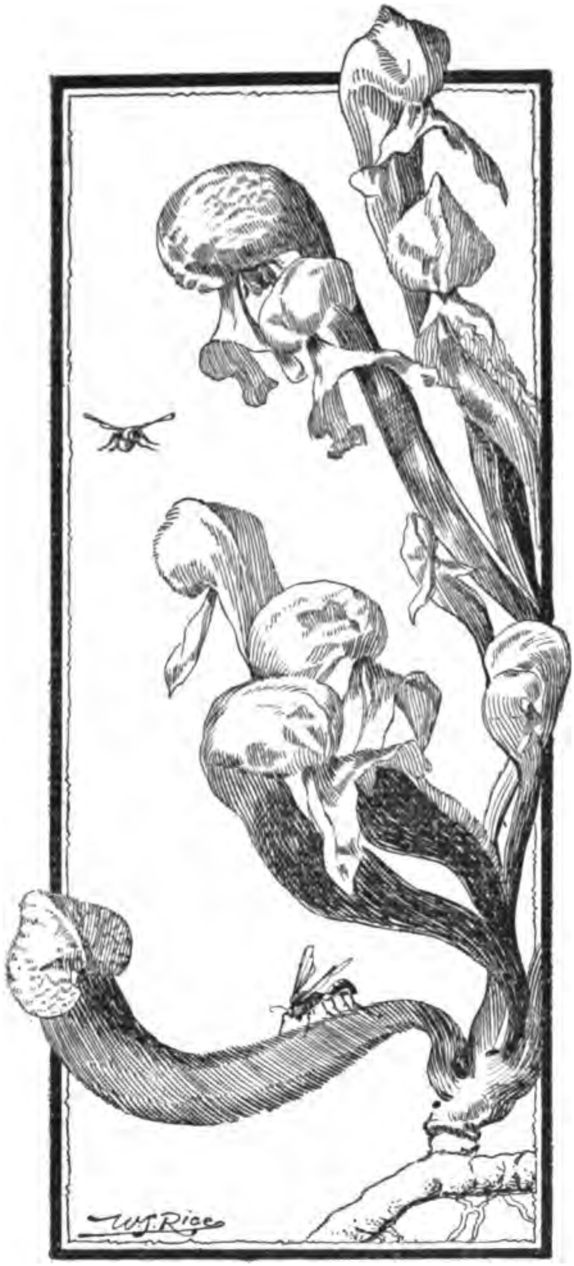
This rule will in time tend to promote stability and uniformity of nomenclature for all known species and genera in their widespread continental ranges. [TO BE CONTINUED.]

BRIEFER ARTICLES.

A CARNIVOROUS PLANT.

Last summer, while traveling through the Sierra Nevada mountains, the writer came across a wonderful curiosity in the plant line, known as the California pitcher plant (*Chrysamphora Californica*), which is one of the most ingenious traps for insects in the plant kingdom.

The leaves of this plant are hollow tubes, in shape not unlike a cornucopia. The insect when alighting upon one of these hooded tubes suddenly discovers on the under side a round opening, which he concludes is a fine shelter from rain or cold weather, and attracted by a trail of honey, with which the plant is besmeared, he enters the arched



The Calfornia Pitcher Plant.

interior — the little transparent sky-lights in the dome illuminating his way as he slips down into the tubular chamber. When his hunger is satisfied he attempts to retrace his steps, but becomes bewildered by the dazzling light coming in through the windows and loses sight of the door in the floor by which he entered.

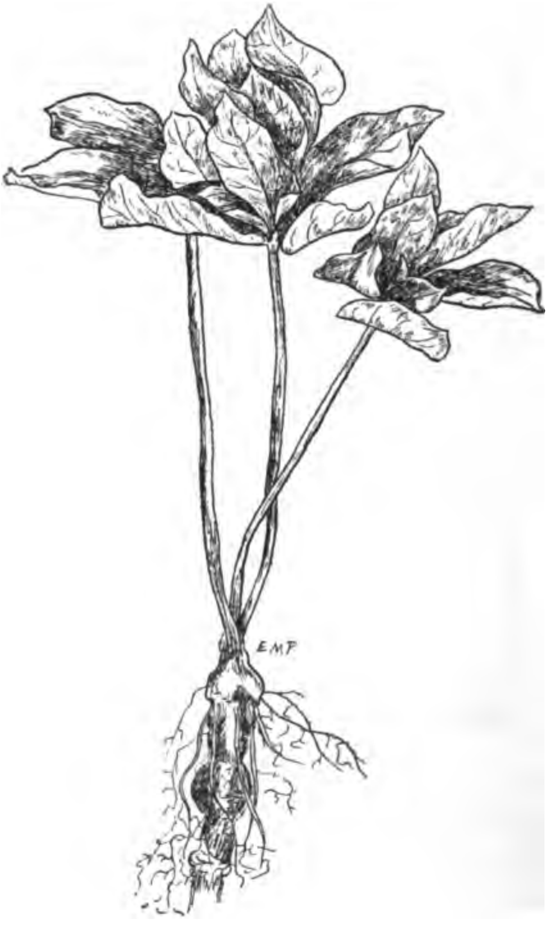
In his eagerness to escape he flies upwards, bumping his stupid head againt the roof, and plunging downward into the tube, he struggles to rise again, but countless stiff bristles pointing downwards intercept his progress and prick his body with every movement. At last in an exhausted state he drops to the bottom of the tube, where there is a small pool of digestive juices which the plant secretes, and by which it obtains nourishment from the bodies of hapless insects. Even wasps, butterflies and grasshoppers sometimes fall victims to the plant's voracious appetite.

WILLIAM S. RICE.

MANHEIM, PA.

A RARE FREAK OF THE TRILLIUM.

The readers of THE PLANT WORLD may be interested in a short description of a somewhat unique form of the *T. sessile* which was collected last spring. Instead of one stem there were three starting from



a single large bulb. One of the stems had three whorls of three leaves each. The lower whorls were crowded very closely together, while the upper two were half an inch apart. There were four petals, no sepals, five stamens, three styles and stigmas, while the ovary was six-angled.

The second stem had two whorls of three leaves each. As in the first stem there were no sepals but six petals, seven stamens, four styles and stigmas, and an eight-angled ovary.

The third stem was similar to the second in the matter of leaves. It had three sepals, six petals, nine stamens, two styles and stigmas. A spider had taken up his abode in this flower and partially destroyed it, making it conform to his ideas of architectural beauty.

The trilliums are prone to freaks, and this one was probably caused by overnutrition. The specimen was preserved and will be given to anyone who is making a special study of the trilliums.

TROY, O. LEWIS S. HOPKINS.

A CARNIVOROUS BOG.

Between Ocean Grove and Avon, N. J., a number of small canals, intersecting, help to form a most glorious sphagnum swamp—that is, glorious for the botanist. The area covered and drained by the numerous little runs, hardly more than a city block, contains islands, peninsulas, hills and vales in miniature. The eye is caught by the lush green of the low growing swamp grass, richly embroidered with meadow beauty (*Rhexia Virginica*), water lobelia, sea pink (*Sabbatia stellaris*), *Polygala sanguinea* or milkwort, *Elodes* (swamp St. John's-wort), white water lilies, *Xyris* or yellow-eyed grass, while here and there a tall white-fringed orchid rears its stately head against a background of pines and beach plums.

A second glance reveals thousands of plants of the thread-leaved sundew, interspersed with the more common spatulate leaved. To see these interesting plants at their best one must go no later than ten o'clock, for after that time the pretty rosy flowers of *Drosera filiformis*, and the white ones of *D. Americana*, grow sleepy. The rule seems to be, only one flower at a time, and this one, though it be in the middle of the raceme, is always uppermost, the flower stem bending to so accommodate it. The flowers which have bloomed form a string of green berry knots, with a little rosy fringe coming from the centre. Though the light green flower stem is perfectly smooth, the long thread-like leaves are covered with small red hairs, rather bulbous at the end, and very sticky. The bulbous expansions are small red glands which exude a viscid digestive fluid. Touched with the finger this substance is drawn out like the thread of a spider's web. When an insect alights on the leaf, attracted by the smell of the sticky fluid (I have seen quite a large yellow spider so caught), he is caught and held by its gummy mass; the hairs then hold and clutch him, pouring out a fresh exudation at the same time, which shortly envelops and digests him. In the course of a few hours the leaf has sucked the poor victim's juices, and used them in the manufacture of its own protoplasm. Nature being unable to provide the nitrogen needed, in the boggy earth, the sundews take this means of securing the same. The rivulets in the bog are beautified by the exquisite golden helmets of the bladderwort (*Utricularia*). When taken from the water the roots are covered with a black ooze, which on being carefully washed away, disclose a string of small bladders, that supply the plant with liquid manure, not only from water-beetle, larvae and other insects, but also from trout and other young fry of fresh water fishes. While the sundew and other carniverous plants are forced to catch and digest their prey, the bladderworts and other water trappers save themselves that additional trouble and expense by macerating and soaking it, till it reaches the condition of a liquid manure ready dissolved for absorption and easy to assimilate.

NEW YORK CITY. PAULINE KAUFMAN.

THE WILD FLOWER PRESERVATION SOCIETY.

An editorial statement in connection with the Society, published in the July issue of the *American Botanist*, received by us on September 6, seems to have been deliberately made with the object of misleading the public. The paragraph is here quoted in its entirety:

"It is interesting to observe the different ways in which our two societies for the protection of plants go about the business in hand. The original "Society for the Protection of Native Plants" has already issued six leaflets calling attention to the plants that need protection and suggesting means of protecting them. The latest publication is a poster, which is sent free to any one who will place it in a conspicuous place. Membership in this society costs nothing, and the leaflets are sent to all who enroll as members. The secretary is Miss Maria E. Carter, Boston Society of Natural History, Boston, Mass. The imitator of this society, the "Wild Flower Preservation Society of America," is approaching the subject by means of illustrated lectures held mostly in our larger cities. Membership in this society costs a dollar a year. The secretary is Charles L. Pollard, National Museum, Washington D. C. Those who are actively interested in protecting the wild flowers will probably find one or the other of these societies to meet their requirements."

In this short paragraph there are several distinct misleading implications. First let us consider the implied suggestion that while the New England Society is engaged in active work, our own organization is idle. The former body has now been in existence nearly two years, and during that time has naturally had ample facility for the publication of almost any number of "leaflets." The Wild Flower Preservation Society was formally organized at the end of last April, but was not publicly launched until May 22. The summer season naturally hampered the officers in the collection of dues and the raising of funds. Yet in the four months of its existence the secretary and treasurer have between them distributed the prize essays of Dr. Knowlton and Mr. Grout, together with the society's circular, to nearly 2000 persons, while through the medium of THE PLANT WORLD, our official organ, there have been published three additional essays, directions for forming local chapters, the by-laws of the society, and other matter. It is just here that *The American Botanist* is peculiarly maladroit, for in remarking, "Membership in this society costs a dollar a year," it deliberately ignores the fact that our members receive THE PLANT WORLD, the subscription price of which is one dollar, without charge, *in addition* to whatever extraneous publications may be issued, and this amount of instructive reading matter certainly does not compare unfavorably with the six leaflets and poster already published by the New England Society. Moreover it is misleading to state that membership in the latter "costs nothing." While it is true that anyone may enroll and receive the publications without charge, the society derives its income, and therefore its existence, from the sustaining members, who pay one dollar a year; and it naturally expects every lover of the wild flowers to contribute his mite toward their preservation; thus for all practical purposes, the dues are one dollar in each society.

It is not true that we are "approaching the subject by means of illustrated lectures held mostly in our larger cities." The Society was most appropriately launched by means of a public lecture at the capital, and the secretary expects to deliver one or two lectures during the coming season in connection with the organization of local chapters. This, however, is but an incidental means of arousing public sentiment. As for our being an "imitator" of any other society, such a suggestion comes with poor grace from a journal so given to imitation as *The American Botanist.*

Not content with the publication of the editorial we have quoted,

this magazine has, in each of its recent issues, taken every opportunity to sneer at the Wild Flower Preservation Society, and at the matter of plant protection in general, as evinced by its approval of an article in *Leslie's Weekly* making a plea for free license to children to pick flowers in all the public parks. Friends of the wild flowers should be warned against the wolf masquerading in sheep's clothing, and will do well to give serious consideration to such utterances as these. We suspect that the effort to belittle the work of this Society and to flatter the Boston organization has as its object the wish to create antagonism between the two bodies; but, fortunately, our relations are entirely cordial, and both societies are working, and will continue to work, in perfect harmony, regardless of the envy or malice of those who are not in sympathy with the movement. CHARLES LOUIS POLLARD,
Secretary.

GENERAL ITEMS.

THE large herbarium of Mr. C. G. Pringle, the veteran botanist and collector of Mexican plants, has been transferred to the University of Vermont in connection with the Frost herbarium, and Mr. Pringle has been appointed as Keeper. The University is to be congratulated upon this important acquisition.

THE midsummer issue of the *Fern Bulletin* contains as frontispiece an excellent portrait of Mr. Charles Francis Saunders, of Philadelphia, widely known as a writer on botanical topics, and a frequent and welcome contributor to our pages. It also contains a most interesting article by Mr. E. C. Anthony on "Fern Hunting in Nassau," with the usual serials and short notes.

IN THE Bulletin of the Torrey Botanical Club for July, Elizabeth G. Britton presents some interesting notes on the bristle-fern, *Trichomanes radicans.* Recent studies have led to the conclusion that several distinct species have hitherto been confused under the same name; and the suggestion is made that the plant of our Southern States, which is uniformly different from the material from tropical and subtropical regions, be known as *Trichomanes Boschianum* Sturm.

WHAT undoubtedly is the largest known tree in the world, says a press dispatch from Fresno, Cal., has recently been discovered two and one-half miles from the Sanger Lumber Co.'s mill, at Converse Basin, in the Sierras, in this county. The discovery was made by a party of hunters, but little credence was given to the report, as every one thought the description of this colossus of the forest was exaggerated, but it has since been visited by people who have verified the finders' statement. The monster was measured six feet from the ground and it took a line 154 feet and 8 inches long to encircle it, making it over 51 feet in diameter. The tree is a few rods from the company's boundary line and is on the Government reserve. It will therefore be of interest to sightseers and will escape the woodman's axe.—*American Gardening.*

THE Department of Forestry at the World's Fair, St. Louis, has sent out a preliminary circular specifying the classes of entries in this department. Ample space has been assigned, and the exhibits promise to be very interesting.

THE New York Botanical Garden has had two rarities in flower in its greenhouse recently. One is an orchid, a species of *Oncidium*, which develops flower clusters of enormous length, the specimen at the Garden having five at one time, the shortest of which was 4 feet 3 inches, while the longest was 12 feet 6 inches. The other plant is a species of palm, endemic in the Seychelles Islands, and known as *Phœnicophorium Sechellarum.* Until the time of its first flowering, at the Garden, in January, 1901, the plant had not been known to flower in cultivation.

NOTES OF CURRENT LITERATURE.

MR. ROLAND M. HARPER, accompanied by Mr. Percy L. Ricker, of the U. S. Department of Agriculture, visited the well-known Okefinokee Swamp, on the border line between Georgia and Florida, during the past summer, and tells of his experiences in a letter to Dr. John K. Small, part of which is published in the current issue of *Torreya.* This region has apparently been neglected by botanists. Mr. Harper found the swamps to consist largely of open country, with Nuttall's bald cypress (*Taxodium imbricarium*) as the predominant tree. In many respects the vegetation is said to resemble that of the Great Dismal Swamp, in Virginia, which is much better known.

IN AN article on "Seed Dispersal of *Viola rotundifolia*" Mr. R. G. Leavitt, in *Rhodora,* describes the remarkable power of projection exhibited by this species. The opening seed valves hurl the seeds easily from one to two feet; three seedlings were found at a distance of five feet, and one at a distance of nine feet.

THE Bulletin of the Botanical Department of Jamaica contains a most interesting article on vanilla culture in the Seychelles Islands. It appears that cultivation is so profitable that the little colony of people in these remote islands depend on vanilla for their prosperity. The vanilla is an orchid of climbing habit, and hence the newly-planted cuttings must be provided with trees or other supports. They require very little care for the next eighteen months. The vines are then pruned or "checked" to induce flowering. It is necessary to hand-fertilize all the flowers, this work being done by women and children. The pods grow to their full size in five or six weeks, and are then cut and cured for the market.

EDITORIAL.

WITH the present number THE PLANT WORLD completes the fifth year of its existence, and it is perhaps appropriate that we should indulge in a brief retrospect. For a number of years the editor-in-chief had in mind the establishment of a popular journal of botany, being convinced that there was not only room, but a demand for a journal that could present the interesting and popular side of plant-life divested as far as possible of the technicalities. The plans were slowly matured, were submitted to and met with the approval of a number of eminent botanists, and finally, in October, 1897, THE PLANT WORLD was formally launched. During the first two years of its existence, owing to an unfortunate business management, the journal did not succeed as it might; but since that time we are pleased to be able to state that its progress has been assured and steady. Within the past eighteen months the subscription list has more than doubled, showing that beyond peradventure it has made a place for itself. Our subscribers are scattered over every State in the Union, as well as in foreign countries, and it is a matter of great satisfaction to the editors to receive, as we do, words of commendation from our readers. We look back with perhaps pardonable pride over these first five years. It was distinctly stated when the journal was started, that it would not be the organ of any party, or for the purpose of exploiting any particular phase of botany or botanical nomenclature. This standard has been maintained. Our contributors have been at liberty to write as they please, so long as it is within the acknowledged scope of the journal, or to employ the nomenclature that is most familiar to them. We have labored to make THE PLANT WORLD a journal of popular botany in the widest and best acceptance of that term. Among our contributors are numbered a host of well-known amateurs and popular writers, as well as a majority of the leaders in American botany. To all we return our sincere thanks.

They have made our success possible, and we turn our faces toward the next semi-decade with buoyant hope. The journal will be enlarged and improved from time to time, as it has been in the past, for while we take pride in what we have accomplished, this is but a measure of what we hope to do in the future.

OUR passing reference to the "American Botanical Club" in connection with the "Gray Memorial Chapter" has elicited corrections from officers of both organizations. Dr. George P. Ells, of Norwalk, Conn., General Secretary pro. tem. of the latter body, states that it is still in existence, and is now considering a proposition from the President of the American Botanical Club for amalgamation. The latter officer, on behalf of his society, writes as follows: "In justice to THE PLANT WORLD, as well as to the Gray Memorial Botanical Chapter and the Botanical Club, permit me to say that the club is in no way a revival of the Chapter. The Chapter is still in existence, although we have nearly all its members upon the Botanical Club's list. The spirit of both societies is the same, — to find out all that is interesting about plants — but each is going about the matter in its own way."

We are indeed glad to learn that an organization with the long and useful career of the Gray Memorial Chapter is still carrying on its work. And in this connection the proposition made by the President of the American Botanical Club for amalgamation arouses both our sense of the ridiculous and our wonder at so remarkable a display of inconsistency. It will be remembered by those of our readers who happen to be acquainted with *The American Botanist* (the genial editor of which is likewise the President of the American Botanical Club), that in the last issue of that periodical the Wild Flower Preservation Society was roundly scored for having presumed to suggest to the Society for the Protection of Native Plants, that a union would be desirable. It was said that we "made a bad matter worse" by publishing the circumstance of the offer and its declination. If the Wild Flower Preservation Society was presumptuous in proposing to include in its national scope a body that had been in existence only two or three years, what are we to think of the action of a still younger society in offering to "amalgamate" with the Gray Memorial Botanical Chapter, which has been in existence a decade or more? We believe that most of our readers will consider it an unparalleled piece of effrontery. The underlying motive is not at first apparent, but can be readily understood when it is realized that the Chapter originally had a publication organ of its own, known as the *Asa Gray Bulletin*, which in its later years was a friendly rival of THE PLANT WORLD; that the *Bulletin* was finally acquired by us, and its publication discontinued; that six months afterwards *The American Botanist* was started; and that in a year after this, the editor of the *Botanist* founded the American Botanical Club. In the circular of information sent out by the latter occurs this statement; "The Club has no 'official organ', though everything of interest in members' reports, as well as news of the Club, *will be published in the American Botanist*" (italics ours). These facts are both entertaining and conclusive, and we leave our readers to draw their own deductions.

BOOK REVIEWS.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE. FIRST ANNUAL ISSUE. BOTANY. Part I. London, May, 1902. Price, 21 shillings.

By the courtesy of the Smithsonian Institution THE PLANT WORLD has received for review a copy of the first annual volume on botany of the "International Catalogue of Scientific Literature." The workers in the field of science have become so numerous, and the places of publication so widely scattered in recent years, that it is no longer possible for the individual student to keep up with his subject without aid of some kind. Several scientific societies have attempted to furnish this aid, but the subject has long since grown beyond the possibilities of any one of these, and it has for some time been apparent that it could only be handled by international coöperation. Agitation for this international plan of work was begun nearly fifty years ago, but only took concrete form about 1893. Many conferences were held by representatives from the various countries, and finally the plan was formulated which has resulted in the volume before us, which represents but one of the seventeen subjects to be similarly handled.

Botanists have waited long and anxiously for the appearance of this volume, and as it sets the pace for all others it will be well to examine it with some care. It is supposed to contain a reference to every botanical article published anywhere in the world during each calendar year. Five languages only are to be used in this catalogue (Latin, English, German, French and Italian), and if an article is written in a language other than these, the reference is to be translated into English. A very elaborate classification of subjects has been adopted, embracing nearly one hundred and fifty topics. First is a complete authors' catalogue, after which follows the classification by topics. Theoretically, this should furnish a very complete and useful compendium of current literature, but practically, as carried out in this volume, it is disappointing in a number of particulars. Thus, in spite of the extreme classification of subjects, there is no entry for fossil plants. Papers on this subject are relegated to the volume as paleontology, although they are scattered under various obscure topics in this volume. This makes it necessary to look in two volumes to cover this subject. It is necessary to read to the bottom of page vii to ascertain the fact that this volume is intended to cover the year 1901. This information should have been given on the title page. On page xiv it is stated that, owing to difficulty in securing copy, this volume is incomplete, and is to be followed in a few months by another. The natural inference would be that this covers either a part of the alphabet or a definite part of the year. Neither assumption is correct, and it is impossible to detect any rational plan which governed the selection of the references in this volume. American sources seem to have been sadly slighted, and even when drawn upon the references appear to be quite at random. Thus but two references are taken from this journal, one an obscure note in number five, and the other from number seven. Other journals are treated in the same manner, apparently not one being completely indexed. It would seem that after having waited for upwards of fifty years for this volume, a further delay of a few months could have been endured if by thus doing it could have been made complete for some portion of the period or field, especially if each volume is to cost twenty-one shillings. So far as I am able to learn no American botanist reviewed these references, and as a result a number of avoidable errors occur. There are also a number of apparent inconsistencies in the use of type.

While this index of botanical literature, when properly systematized, should prove a boon to working botanists, this volume, taken as a sample, is distinctly disappointing in many particulars.

F. H. KNOWLTON.

POSTELSIA: THE YEARBOOK OF THE MINNESOTA SEASIDE STATION. 1901. St. Paul, Minnesota. Privately published.

Under this quaint title, which is the technical name of a seaweed of the Pacific, are grouped together seven essays, by six different authors, the list being as follows: "Uses of Marine Algæ in Japan," K. Yendo; "Remarks on the Distribution of Plants in Colorado, East of the Divide," Francis Ramaley, "The Phylogary of the Cotyledon," Harold L. Lyon; "Botanizing in Jamaica," Eloise Butler; "Algæ Collecting in the Hawaiian Islands," Josephine E. Tilden; "The Distribution of Marine Algæ in Japan," K. Yendo; "The Kelps of San Juan de Fuca," Conway MacMillan.

These papers, we learn from the introduction, were first given before the members of the Minnesota Seaside Station during their season on the coast in 1901. This station is maintained by the University of Minnesota, under the direction of Professor Conway MacMillan, and is the most recently organized of our marine biological laboratories. The essays are written in a pleasing style, and are well adapted for general reading. The book is beautifully printed on handmade paper, with numerous half-tone engravings and several quaint Japanese pictures on folded inserts. The edition is limited to 250 copies, the price of the book being $3.25, postpaid. C. L. P.

THE PLANT WORLD

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EXTRACTS FROM THE NOTE-BOOK OF A NATURALIST ON THE ISLAND OF GUAM.—II.

By William E. Safford.*

ILLUSTRATED.

TUESDAY, August 15, 1899.—Have received orders to relieve the acting governor, Mr. William Coe, and to take up my residence at Agaña, the capital of the island. I have also been appointed Judge of the First Instance, Registrar of Deeds and Titles, and am to act as Auditor of the Treasury. For the present, while the Palace is undergoing repairs, the Governor will remain on board the Yosemite and I will have charge of the government in Agaña.

Mr. Coe is a half-caste Samoan, son of Captain Billy Coe, the well-known pilot of Apia, to whose stories of adventure I have many times listened when visiting him in the trim little cottage on Matauta Point, where he used to sit day after day with his glass at hand scanning the horizon for approaching vessels. Coe, the son, came here shortly after the American occupation, accompanied by his young wife, a sweet-faced, gentle, brown-skinned woman, daughter of a Caroline Island chief. He was appointed acting governor by the officer in charge of the "Nanshan," to relieve Don Joaquin Perez y Cruz, formerly Gobernadorcillo of Agaña, who had been entrusted with the government of the island together with a *junta* composed of Rev. José Palomo y Torres, the parish priest, Don Juan Torres y Diaz, Don Vicente Herrero y Roberto, Don Luis Torres y Diaz, and Don Antonio Martinez y Pangelinan, principal citizens of Guam, natives of the island and all men of intelligence and breeding. A misunderstanding had arisen on account of the delivery of a part of the material of war remaining on the island to the representative of Spain sent hither to take possession of it, in accordance with the provisions of the treaty of peace. Don Joaquin resigned his charge, and William Coe was appointed in his stead.

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* Continued from September issue.

When the United States seized the island of Guam, June 21, 1898, the Spanish governor and his staff, together with the Spanish soldiers stationed on the island, were carried off to Manila on board the "Charleston." The only officials remaining on the island were Don José Sisto, the *Administrador*, or treasurer, who assumed the office of provisional governor of the remaining islands of the group, the *Asesor Letrado*, or Attorney for the Crown, and the civil medical officer, Dr. Francisco Napal, a poor little fellow, left entirely without medicines or appliances for caring for the sick. Don Sisto proceeded to pay himself in advance as Provisional Governor of the Marianas, holding that the money in the treasury was a fund to be devoted to the expenses of the government of the group in general, and not simply to the island of Guam.

On the arrival of the "Bennington," in January, 1899, Captain Taussig ordered an examination of the books of the treasury, and discovered what Sisto had done. He removed him from office, required him to refund the money, and turned the government over to the junta mentioned above.

* * * * * * * * * * * *

Took up my residence over the Treasury, on the right of the Palace, in the quarters formerly occupied by Sisto. My Japanese boy, Miyomoto, helped me to unpack my clothing and books. Among the latter I have 200 volumes from the library of the late Robert Louis Stevenson, sold to me by Mr. Blacklock, of Apia, with the authority of Mr. E. W. Gurr, Solicitor of Mrs. Stevenson. My furniture consists of a cane-bottomed bed with high posts supporting a mosquito-net canopy and curtains, a table of a polished native wood called *Ifil*, several chairs, and a Chinese earthen-ware bath-tub, like a jar, with representations of bamboos, etc., in relief on the outer surface, kindly lent me by Mr. Henry Mellinchamp, the pilot (he refused to accept money for it).

Miyomoto has had a great time sweeping, dusting and cleaning the rafters from cobwebs. My rooms are large and well ventilated. They are unceiled, and the roof-tiles above give them a somewhat unfinished look. On two sides I have a balcony enclosed with shutters and sliding windows which, instead of glass, have thin translucent bivalve shells, somewhat like those of a pecten. From my balcony I can look in one

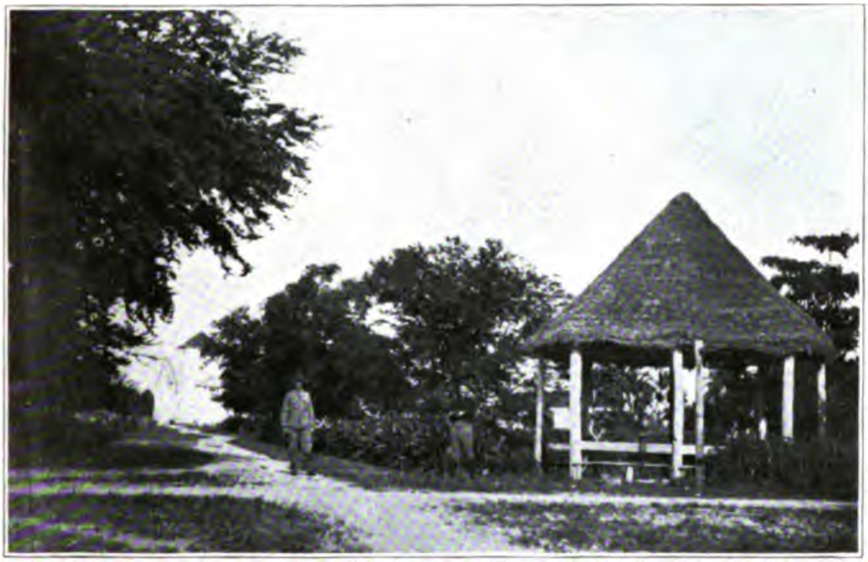

Fig 1. Pagoda in Plaza showing walk lined with Sea Daffodils (*Hymenocallis littoralis*) and on the left, *Pithecolobium dulce.*

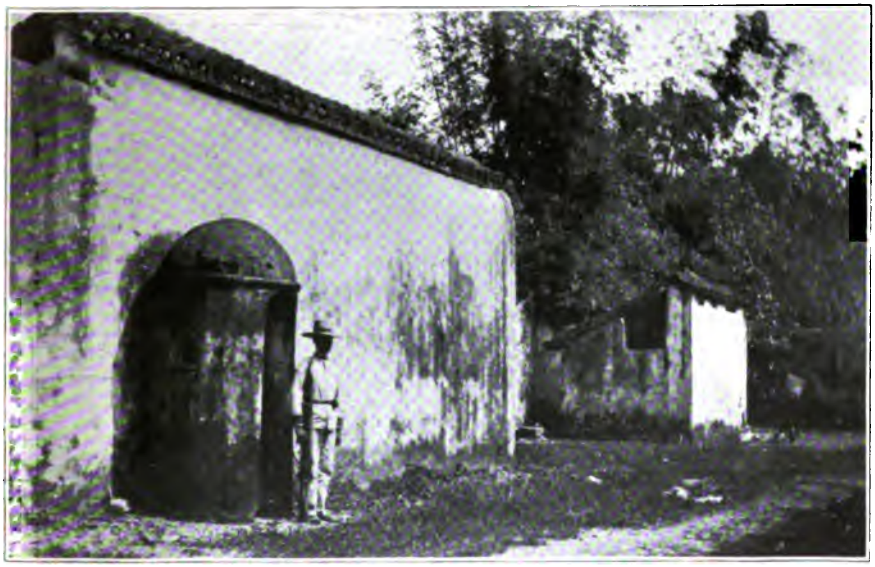

Fig. 2. Sentry-box facing old Presidio, with native soldiers; bamboos on right.

direction across the plaza toward the old church, with the Palace on my right and the Tribunal, or jail, on my left; in another direction I look down on my garden, a tangled mass of tropical growth. On the walls I find records of children's games: "Dolores, 1111; Mercedes, 111; Carmen, 11111; Concepcion, 11; Vicente, 11111; Juan, 111." Behind the shutters and the doors are swarms of Tipulæ, like great slender-legged mosquitos, which set up so vigorous a vibration as to look like vague clouds. Under the eaves I find securely glued a number of tiny lizards' eggs. The lizards, or more strictly speaking, geckos, run about the roof, upside-down, without apparent effort, holding to the rafters and tiles by their padded toes, catching flies and moths, and every once in a while chattering like a bird.

A shower comes up and Miyomoto fills my tub on my rear balcony with water from the eaves by means of a bamboo trough left by my predecessor. The tiles leak in several places, forming pools on the polished *ifil* floor; so that the bed, books, etc., must be moved to places of safety. Everything outside dripping with moisture; temperature delightful; on roofs creeping ferns with leathery lobed fronds like huge oak leaves (*Polypodium phymatodes)*; have seen the same species climbing trees in Samoa.

Cart arrives from the port bringing a lot of plants given me by Mr. David Haughs, of the Honolulu Botanical Gardens. All of them in fine shape, having been cared for by me personally during our passage. Among them are the following:

Seaforthia elegans, a graceful, pinnate-leaved palm; *Livistonia Chinensis,* (or "*Latania borbonica*") a handsome fan-leaved palm; *Oreodoxa regia,* the handsome "royal palm" of Cuba and Brazil; *Cocos plumosa,* a fine feathery-leaved species; *Livistonia rotundifolia,* an East Indian fan-palm; *Thrinax argentea,* the silver thatch-palm of the West Indies; *Sabal Blackburneana,* the Bermuda palmetto; *Pithecolobium Saman,* known as "monkey-pod" in Honolulu, where it is a favorite shade-tree; *Cassia fistula,* in Honolulu called the "golden shower;" *Cassia florida,* the "iron-wood" of the Dutch East Indies; *Mangifera Indica,* grown from Jamaica seeds; *Ceratonia siliqua,* the Carob tree, or "St. John's bread;" *Poinciana regia,* the flamboyant tree, a handsome leguminous shade tree having orange-red flowers, common in Honolulu and Porto Rico (a long avenue of it between Ponce and the sea on the latter island); *Haematoxylon campechianum,* log-wood; *Terminalia catappa,* called "Kamani" in Hawaii, and "Talie" in Samoa, bears almond-like nuts, and hence called "Almendro" in Cuba; *Theobroma cacao,* the cacao or chocolate plant; *Cordia subcordata,* called "Kou" in Hawaii; *Cola acuminata,* the "Cola" or "Goora-nut tree" of Africa; *Laurus (Cinnamomum) camphora,* camphor tree; *Casuarina equisetifolia,* Australian iron-wood; *Macadamia ternifolia*, Queensland nut tree, leaves prickly, like holly; *Piper nigrum*, black pepper, a vine very much like the Betel pepper in appearance; *Areca alba (Dictyosperma alba)*, closely resembling the betel-nut palm, *Areca catechu; Areca rubra (Dictyosperma rubra)*, similar to the preceding but with reddish foliage.

Mr. Haughs also gave me a supply of seed of *Eucalyptus robusta*, or "swamp mahogany;" *Eucalyptus citriodora*, called "lemon gum" on account of its fragrant leaves; *Grevillea robusta*, the "silk-bark oak" of Australia; and *Casuarina equisetifolia*. Professor William T. Brigham, Director of the Bernice Pauahi Bishop Museum, gave me seed of the beautiful, fragrant, blue-flowered water lily, *Castalia scutifolia;* Mrs. Ellen Riemenschneider gave me growing plants of *Antigonon leptopus* and a yellow-flowered *Bignonia;* Mrs. Belle Fuller Jones, seed from a thornless Algaroba *(Prosopis juliflora)*, an accidental variety, growing in the grounds of her Honolulu home; and Doctor Alvarez, several pods of "St. John's bread" *(Ceratonia siliqua)*.

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[NOTE.—These plants began to grow vigorously, but some of them were killed by a severe hurricane which visited the island later. Among them were a number of species already established on the island: *Cassia fistula, Mangifera Indica, Poinciana regia, Terminalia catappa, Theobroma cacao, Cordia subcordata, and Casuarina equisetifolia*. I planted an avenue of palms composed of the *Oreodoxa regia, Livistonia Chinensis* and *Seaforthia elegans* from the street to the door of the church, but they were killed by the hurricane, whether by the blasting wind or the excessive rain-fall I do not know. Plants of the alligator pear *(Persea gratissima)* raised by me from seeds met with a similar fate. *Macadamia ternifolia, Laurus camphora* and *Ceratonia siliqua* did not thrive. I left two good plants of *Haematoxylon campechianum* growing on the hill above San Ramon, to the left of the road to Sinahaña.]

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Called on Father Palomo, the parish priest, and found him to be a man of refinement and breeding. He speaks English and French very well and is familiar with the classics of our language as well as with the principal Spanish, French, and Latin writers. I was surprised to find a native so highly accomplished. As a young man he studied with the parish priest, perfected his English and French by conversation with visitors to the island, and went to Manila, where after a course of study he was ordained to the priesthood. His mother was a descendant of Don Luis Torres, the Sargento Mayor of whom Kotzebue, Freycinet, Gaudichaud, and Dumont d'Urville speak with great respect in the narratives of their travels. Employed José de Torres as my secretary. He will help me in my botanical collecting and in copying from the archives of the government, in which there is much of historic and economic interest.

Old Spanish artillery pieces and projectiles.

In walking through the plaza noticed some beautiful rose-colored amaryllis (*Zephyranthes rosea*), near a pagoda-like summer-house thatched with Nipa palm leaflets. The walks in the plaza bordered with beautiful white-flowered spider-lilies, or "sea daffodils" (*Hymenocallis littoralis*). (Plate XXI, Fig 1.) Among the trees growing in the plaza noticed *Pithecolobium dulce*, *Adenanthera pavonina*, *Terminalia catappa*, and some high-growing bushes of *Hibiscus rosa-sinensis*. In front of the Almacen, or military store-house, saw a number of old cannon, with pyramidal piles of spherical projectiles. The wheels of many of the carriages almost falling to pieces. (Plate XXII.) Near the door of the Almacen a symetrical orange tree not now in fruit. In the Palace garden many ornamental *Codiaeums*, with yellow and green and red foliage; dark red, or rather purplish, *Eranthemums*; variegated *Graptophyllum hortense*, and ornamental Araliaceae. The air fragrant with the perfume of the Ilang-ilang (*Cananga odorata*), of which there are two trees in the garden. Garden surrounded by high picket fence of wood with obelisk-shaped posts of masonry. Behind the palace a broad terrace on a level with the second story, approached by stone steps, with pedestals along the edge for pots of ornamental plants. (Plate XXIII.) In the yard behind the Palace lemon trees, *Morinda citrifolia* (the roots of which are an important dye-stuff), and. *Anona squamosa*, the "sweet-sop," or sugar apple, here called *Atis*. Near the fence two trees of *Carica papaya*, the fruit of which is smaller than I have seen in Samoa and tropical America. Visited the *Presidio*, or penitentiary, formerly used as a place of confinement for convicts sent here from Spain and the Philippines. This is behind the Palace. Windows closed by iron bars; sentry-box of masonry near the wall with dome-shaped top; native soldier of Insular Artillery (in reality it is an infantry company) in appropriate uniform of cotton stuff and straw hat, saluted as I passed; beyond this a line of graceful bamboos. (Pate XXI, Fig. 2). Crossed the field behind the Palace; noticed many widely spread tropical weeds, *Asclepias curassavica*, *Indigofera tinctoria*, *Acacia farnesiana*, and a species of *Cestrum* with dark purple berries, called *Tintan-China*, or "Chinese ink," by the natives. On the stone wall bounding the field noticed a Banyan tree growing (*Ficus* sp.), its snake-like roots clasping the wall, and then entering the ground. Seed probably dropped on wall by a bird. Usually the *Nunu*, as it is called by the natives, begins its life as a parasite on some other tree, which it strangles to death. Where the roots cross one another they grow together. From the limbs thread-like roots hang down, which finally enter the ground and become supporting props. Thus a single tree will take the appearance of a grove. My secretary says that the natives believed in the olden times that these *Nunu* trees were the abode of *Aniti*, or spirits, and that many of them still have a superstitious dread of them. It is interesting to note that the same feeling is found among the Samoans with relation to the allied *Ficus aoa* of their islands.

Back to my quarters; found everything in order; boxes in which books had been packed converted into cases by sliding shelves; clothing stowed in lockers of *dugdug* wood (fertile bread-fruit). Noticed some little red-and-black birds with slender curved beaks feeding on the honey and insects of the scarlet hibiscus beneath my windows and some beautiful fruit-doves visiting my Ilang-ilang tree for the sake of its olive-shaped fruit.

Dined at the house of Henry Mellinchamp, the pilot, where I had a most interesting conversation with his son-in-law, Don Pedro Duarte, Captain in the Spanish Army, late Military Secretary to the Governor of Guam. Don Pedro was taken with the other officers to Manila on the "Charleston," but was allowed to return to his family in this island. He speaks in the highest terms of the courtesy with which he was treated by our officers both during the passage to Manila and while a prisoner there. During his absence his wife was very ill. She grieved for him and did not know whether she would ever see him again. A baby was born, but it died. Doña Maria still looks delicate, but the bright-eyed children are pictures of health. Don Pedro is an engineer of ability. While serving on detached duty in the Philippines he often had to act as surgeon to his men and to dispense medicines; so that he acquired from his books and experience considerable knowledge of the diseases of the tropics and their treatment. He says he intends to remain in the island and will follow its destiny.

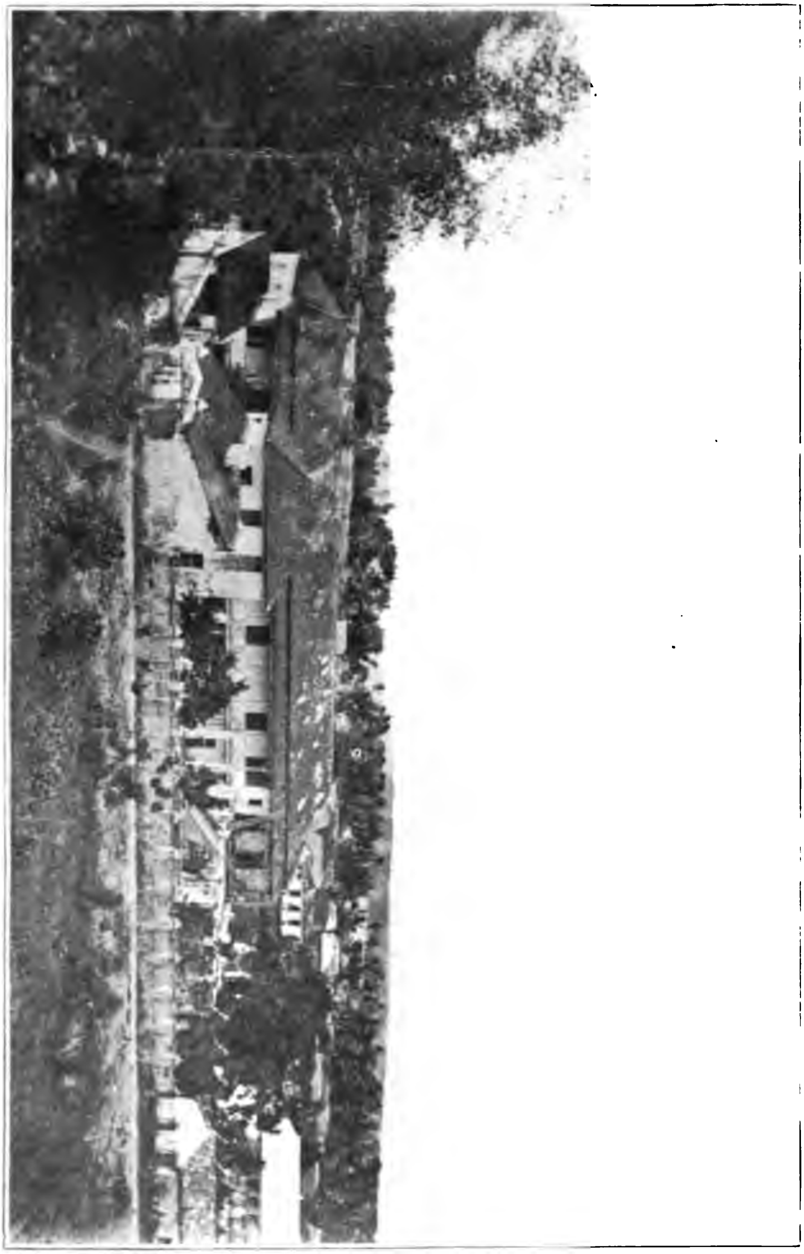
Back to my quarters with my dog. Miyomoto off to visit some Japanese merchants who have established themselves here. On turning in, or rather, on lying down on my bed, I was stung by some small ants which had formed a line across the sheet spread over the mat. Shook the sheets well to get rid of them and then with the rain pattering on the tiles went to sleep.

[TO BE CONTINUED.]

A STUDY OF THE ISLAND FLORA OF THE MISSISSIPPI RIVER NEAR SABULA, IOWA.

By T. J. and M. F. L. Fitzpatrick.

THE shifting currents of the Mississippi river cause sand and other sedimentary material, as well as drift, to be taken up, carried to other points, and deposited when quieter waters are reached, as soon as the carrying load becomes too heavy. As the deposits accumulate the depth of the river diminishes until the water shoals. Wave action now comes to the aid of the deposition agency and the shallow river



Rear of palace showing terrace.

bottom is heaved up into a low lying island, which is scarcely above the water at ordinary stages and is frequently submerged during the rising stages, only to be left a mud flat as the receding period comes. Islands built by pure river agencies are seldom very large, but another agency by way of vegetation now comes and aids very materially.

The island has scarcely emerged from the river before seeds borne by the currents or on the wind fall upon it, strike root, and start out to run their life course. The common black willow, *Salix nigra*, and also *S. longifolia*, are present in large numbers and are soon crowding, so much so that many perish in the struggle, but the vigorous thrive. The roots readily reach the water level in the soil, the rising and subsiding waters bring rich soil coverings and the problem of life becomes easy for the embryo forest. Greater stability as a result comes to the island. The current is checked above, deflected to either side and shoals are formed along the island and immediately below, and new additions are constantly made to the land area, which in turn receive their contingent of willow seeds and subsequent trees. The older portions of the island, however, do not remain the same. High water has caused a more rapid deposit of sediment on the interior of the island because of the checking of the current occasioned by the obstructions due to willow growth, and in low stages the dry sand near the shore is carried inland by the wind and deposited in long narrow low dunes which are scarcely perceptible in the early stages of the island growth. The seeds of *Salix discolor*, finding conditions favorable, begin and develop rapidly and displace the previous growth of *Salix nigra* and *S. longifolia*, which prefer the conditions near the shore and constantly migrate as the island grows. As the interior of the island develops by the agencies of wind and high water, the cottonwood, *Populus monilifera* (*P. deltoidea*), appears and readily makes headway against the *Salix discolor* zone, which in turn takes the *Salix nigra* zone and all make for themselves distinctive zones in new positions. The island as viewed from off shore presents in this stage of its development three distinct zones of tree growth, namely, beginning at the shore line:

1. Black willow zone *(Salix nigra).*
2. Glaucous willow zone *(S. discolor).*
3. Cottonwood zone *(Populus monilifera).*

To these we may add a fourth zone, viz.: the elm zone. The white elm seeds are readily carried by the wind or the currents to the island shores, but the soil is too damp for healthy growth, although a few small individuals may be found among the *Salix discolor* or *Populus monilifera* zone. As the interior of the island develops the higher portions become dry enough to come within the limits of the life range of the white elm, and individuals are to be found ranging in time upwards to more than a hundred years. They frequently appear in considerable numbers and make for themselves a distinctive zone. So, finally, we have a willow-cottonwood-elm society with its attendant flora, which near the shore is hydrophytic and approaches meso-hydrophytic conditions towards the interior.

The island, like everything else in nature, cannot keep still. The checked currents below the island drop sediments continually and additions are constantly made which run the same course in vegetative life as did the previous portions of the island. The contraction of the channel of the river by the lateral growth of the island causes a more rapid current in the river, and the result is the island ceases growing above and laterally on the upper portions, and erosion begins, more pronounced in the upper stages of the water, but gradually the shore trees are undermined, and falling in, are carried away. All the larger islands show that their upper portions are worn inland to the cottonwood and elm zones. The land, however, grows downward, and as the centuries pass the island keeps up its constant movement seaward. A rapid change in the river channel or unusually high water may carry away completely the island, but under normal conditions the island remains a feature of the river, although moving constantly down the river.

Associated with the salix-cottonwood-elm society many characteristic plants of the river islands may be found. *Acer dasycarpum* (the soft maple) prefers the cottonwood zone, though it may be found on either side of this zone. Along with the soft maple are *Vernonia fasciculata* (the iron weed), *Cephalanthus occidentalis* (the button bush), *Steironema ciliatum*, *Stachys aspera*, *Sambucus Canadensis*, *Echinocystis lobata*, *Helenium autumnale*, *Aster diffusus*, etc.

If a space occurs where the trees are less numerous and the soil is low, *Bidens frondosa* appears in great numbers and *Nasturtium palustre* is also found. The damp low soil gives us *Rumex verticillata*, which may also be found in the low sand flats near the river. Its stem runs deep into the soil and the heavy rootstock is strongly attached by its fibrous roots to the soil particles. Other open spaces in the cottonwood zone have *Leersia Virginica* in quantity, forming a miniature meadow.

A little higher ground gives us *Laportea Canadensis* in strong healthy colonies. The interior dune formation gives a flora peculiar to itself. This flora brought in by the wind, high water, birds, and other agencies, is the culmination of the island flora. Here we may find *Smilax hispida*, *Menispermum Canadense* (the moonseed), *Viola papilionacea*, *Fraxinus Americana*, *Solanum nigrum*, a thick-leaved form, also, *Vitis riparia*, *Sisymbrium officinlae*, *Xanthium Canadense* (cockle bur), *Rhus toxicodendron, Ambrosia trifida, Thalictrum purpurascens,* all the harbingers of a mesophytic flora. Conditions, however, are near the minimum for mesophytic vegetation, and no farther advance is possible in the evolution of the island.

In studying the island flora it may readily be perceived that it is but a portion of the development of the mesophytic flora of the second bottoms and of the uplands. Suppose we start with a prairie and a river with all the soil conditions from the sandy low shore to the uplands. The vegetation near the water is the *Salix nigra* zone, next comes the *Salix discolor* zone, third, the *Populus monilifera* zone, fourth, the mesophytic zone, which passes from its meso-hydrophytic conditions on the low bottoms to true mesophytic conditions on the upper second bottoms, and as further development comes advancing up the highlands and becoming meso-xerophytic on neutral ground. Should our island in its evolution become attached to the mainland the vegetation would advance interiorly as indicated.

IOWA CITY, IOWA.

ORIGIN OF PLANT NAMES.*

BY GRACE STODDARD NILES.

II. THE LADY'S SLIPPERS AND MOCCASIN FLOWERS.

FOLLOWING Brunfels, Fuchs and Bock from 1530 to 1555, we find that Dr Rembert Dodoens, physician to the Dutch Emperor, published an important History of Plants in the Low Countries from 1555 to 1578. This work was translated into French, and Henry Lyte of England translated it from French into English, January 1st, 1578, according to his Epistle to Queen Elizabeth. Mr. Lyte added, therefore, to the original text all that he knew of English plants, and their common names. There are very few extant copies of the original edition of Lyte's English translation. As I possess one of these, I thus have explanations of the origin of many common plant names known to the early writers from Theophrastus to Lyte.

Taking up the derivations of our lady's slipper, one must become familiar with the mode of observation of the ancients. The leaves, roots, shapes of flowers, and poisonous and healing properties had much to do with the popular designations used.

The natural order of classification followed today was unknown to early writers. Pliny (23-79 A. D.) knew and described species of *Orchis*, *Satyrion* and *Serapias*, but these names applied to two-leaved species of *Orchis* having spiked racemes. The earliest record of our lady's slipper is vague. It will be observed that the shapes of the leaves, flowers and roots were of great importance to the ancients, just as to the writer of today.

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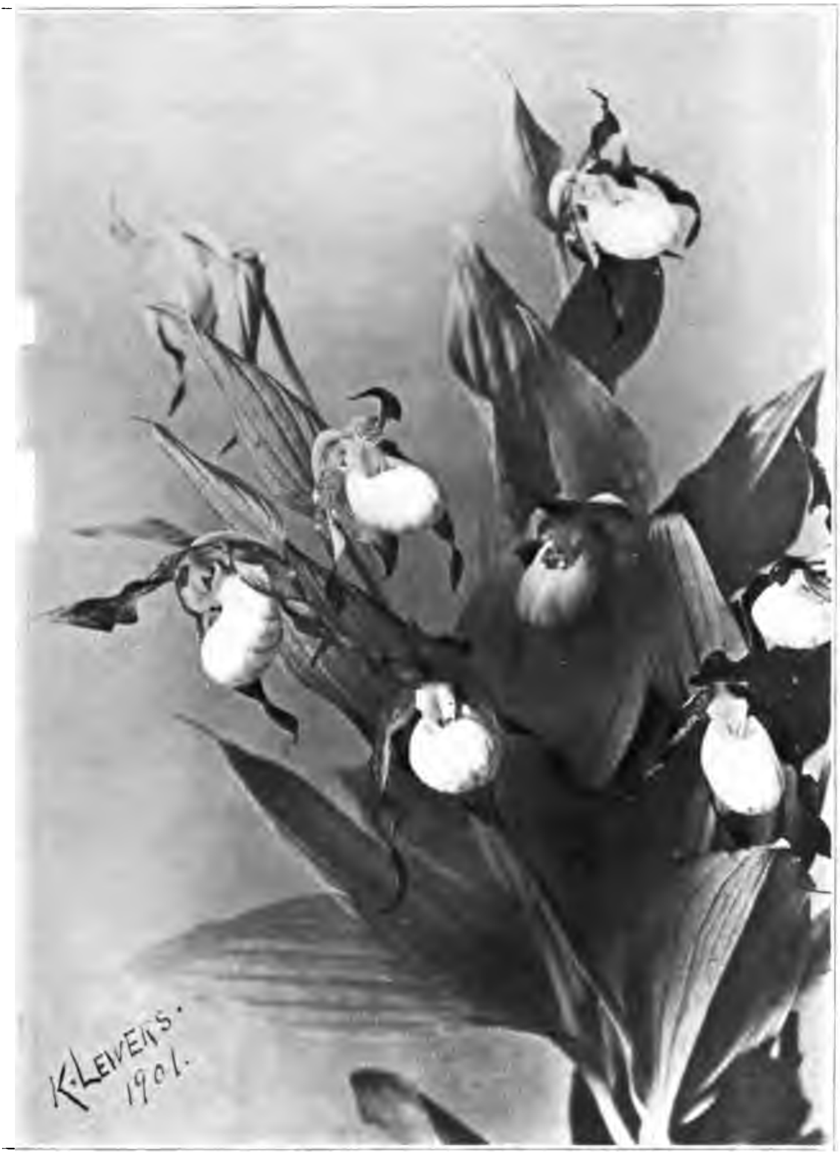
* Continued from September issue.

The leaves of our Cypripediums of North America and Northern Europe are plicate like the foliage of the hellebore. The ancients, therefore, for centuries considered the species of lady's slippers as false hellebore or Indian poke (*Veratrum viride*) or *Veratrum album* of Europe. This plant is found in swamp-lands in company with our Cypripediums and is often confused with them until the flowers are about to unfold. The first name of the lady's slippers appears thus to have been *helleborine*, signifying false *hellebore.* Caspar Bauhin in his Pinax, 187, designates a species of Cypripedium as "*Helleborine Calceolus,*" signifying "bastard hellebore with a round flower." There appears to have been a species of wild white *ellebore* or *nieswurt,* goose nest, known to Galen and Dioscorides. The plant is described as producing broad plicate leaves like *ellebore* save that they were smaller, and were parallel ribbed like the leaves of plantain or gentian. The flowers hung down from the stalk and were of a white color, hollow in the middle, with small yellow spots. After the flower fades there come thick husks, or pods, containing small seed like sand. The roots of these species were full of sap, had a thick rind of a bitter taste, and reminded the ancient herbalists of a goose nest, since they were thready strings snarled or tangled together. This plant grew in moist meadows, and in dark shadowy places in June and July.

Some writers among the ancients thought *helleborine* like *hellebore* only in virtues, and not in fashion of flowers. The error, however, was known to both Galen and Dioscorides, who did not attribute any of the properties of *hellebore* to *helleborine. Epipactis,* therefore, is the Greek name for *helleborine* or *false hellebore;* and is the designation for species of the Orchis family under the genus *Epipactis.* The plicate leaves of *Epipactis* apparently became later confused with the plicate leaves of *Helleborine Calceolus.*

The first records of a lady's slipper appears to have been made intelligently by Dr. Rembert Dodoens in 1616. He describes the European yellow species as *Calceolus Marianus,* Our Lady's slipper. As already explained, Caspar Bauhin designates the same species as *Helleborine Calceolus,* or bastard hellebore. The Latin, *Calceolus,* signifies "shaped like a little shoe," and *Marianus* signifies "Our Lady, the Virgin Mary." Tournefort in 1700 also knew this genus as *Calceolus,* signifying "*Sabot de la Vierge,*" and "*Soulier de Notre Dame.*" In France and Italy to-day these flowers are known as *Sabot de la Vierge,* and are dedicated to the Virgin Madonna.

There are as many as fourteen generic names in the records of the



The yellow Cypripedium or lady's slipper.

science for the shoe-shaped species known from Dodoens' time, in 1616, down to the present period. The yellow lady's slipper of Europe, known to-day as *Cypripedium Calceolus* Linnaeus, is identical with Dodoens' and Bauhin's yellow species of 1600.

Linnaeus in 1740 reviewed this group of plants and included the species under the genus *Cypripedium;* thus originating the common name Venus-slippers or Our Lady's slippers as formerly. He re-established the custom before Christ of dedicating flowers to *Cypris* or *Venus* of classical mythology, the "Divine Mother" of the Roman people. Being a devout Lutheran, he dropped the prevailing name of 1700, *Marianus*, the Virgin Mary, the "Divine Mother" of all people and nations in sacred history. *Cypripedium* is derived from "*Kypris*" or "*Cypris*," a former name of Venus before the Trojan origin of Rome; and "*podium*" or "*pedium*" signifies a sock, buskin or slipper.

Venus as well as Marianus was known as "Divine Mother" and commonly called "Our Lady." Thus *Calceolus Marianus* Dodoens, and *Cypripedium Calceolus* Linnaeus, mean virtually the same when it comes to the origin of the common name, Our Lady's slipper. Linnaeus combines with his name the ancient generic name *Calceolus*, and thus the first species of lady's slipper designated as a *Cypripedium* became *Cypripedium Calceolus* in 1740, which signifies Venus-slippers, round and "shoe-shaped." It will be seen that he combines a good deal of "slipper" and "shoe" in this yellow species of *Cypripedium.*

The Algonquin Indians of northeastern North America saw the same resemblance in this pouch-shaped flower to a "little shoe," and called it Indian's mawcahsin or makkasin-flower, originating the common name moccasin-flower, so appropriate to our native species of *Cypripedium.*

Three or four of our thirteen native species were known to early European botanists in 1600–1700. The first record of an American lady's slipper is mentioned in 1635, and was our showy white-petaled species now known as *Cypripedium reginae* Walter. Iac Carnotii explored our Canadian provinces apparently about the time Samuel Champlain explored Lake Champlain, in 1635 or thereabout. He collected this beautiful orchid and published it with an excellent wood-cut in his work Plantarum Canadensium (1635) under the title of *Calceolus Marianus Canadensis*, Our Lady's slipper of Canada.

This Cypripedium was therefore collected ten years after the landing of the Pilgrim Fathers at Plymouth.

Linnaeus in the first edition of his Species Plantarum, 1753, mentions four American species of this genus as varietal forms of his shoe-shaped species, *Cypripedium Calceolus.* Any history, therefore, relating to that European species also pertains to *all* other species cited as varietal forms by Linnaeus in 1753. He also confused another orchid now known as *Calypso bulbosa* with his shoe-shaped genius, and it appeared in the Species Plantarum as *Cypripedium bulbosum* Linnaeus, known as the bulbous lady's slipper, with three sepals free to the base, the other species of *Cypripedium* having the two lower sepals imperfectly united, and appearing frequently like a single sepal. The varietal forms of *Cypripedium Calceolus* includes, therefore, all species of the genus known at that time save his bulbous Cypripedium (*Calypso*), which then appeared to differ only in number of sepals and root from the other species of *Cypripedium.* It is plainly evident that the European yellow lady's slipper has been considered identical with both our American yellow Cypripediums, as well as with the pink and the white petaled species (*Cypripedium acaule* and *C. reginae).*

Since the present botanical nomenclature dates its starting point for all intelligible generic and specific names, from the first edition of Linnaeus' Species Plantarum, 1753, we find that four of our American Cypripediums known to Europeans 1600–1800, have since 1753 received a confusion of synonyms too numerous to mention in this paper.

The origin of names signifies more in reality than the general flower lover understands, and many a quaint story lies buried beneath the Greek and Latin derivations. Botanical names arise from the structure of the parts of a flower, leaves, roots and their general resemblance to birds, insects and animals, based upon the natural affinity of species and often upon their medicinal properties. Scientists often name species in honor of friends or collectors. The pitcher-plant (*Sarracenia*) was thus named by Tournefort, in honor of Dr. Sarrazin of Quebec, who first sent our Northern species of pitcher-plant to him for identification.

Common names of plants originate locally from ignorance and misapplied meaning often given by children and country folk, who *must* call the flower by some name in order to distinguish it from other varieties. Dumb-watches, St. Jacob's dippers, huntsman's cup and side-saddle flowers are names of childish fancy given the dipper-like leaves and flowers of the pitcher-plant (*Sarracenia.*) The hard shell of the stigma of these flowers remind children of dumb-watches, while the padded pillion, or ancient cushion of a lady's side-saddle, resembles the stigma, and also suggested the name side-saddle flower. The name ram's head moccasin flower (*Cypripedium arietinum*) likewise arose from this flower's resemblance to a sheep's or ram's head; the conical part of the pouched-shaped labellum serving to recall the nose of a sheep, while the twisting sepals and petals in certain positions remind one of the horns; thus originating the specific designation *arietinum*, signifying "shaped like a ram's head."

[TO BE CONTINUED.]

BRIEFER ARTICLES.

THE WEST INDIAN CORKWOOD.

Among the many species of trees known as corkwood, one of the most interesting as well as one of the least known is *Ochroma lagopus*. This magnificent tree is found more or less commonly throughout tropical America, north of Brazil. It is a striking tree and I know no other in Mexico or the West Indies that at all resembles it; but, like many other "good things," it appears born to stay unknown.

In Porto Rico it is one of our most important economic trees, for the "wool" of its seeds is the "goano" or "guano" with which nearly all of the native pillows and cushions are stuffed. Yet Watt does not give it a line in his ten-volume dictionary of economic plants, and even Bailey does not mention it among the 25,000 plant names of his invaluable Cyclopedia of American Horticulture. Its closest relative (though the relationship is by no means apparent), *Eriodendron anfractuosum* DC., the silk cotton tree, is known all around the world, though its home is here in tropical America.

Damp, but not necessarily rich, soil in the hills is a preferred habitat, but it grows well in sea sand or mountain clay. Twenty to forty feet is the average height; the top inclines to be spreading and somewhat open, though the leaf canopy is dense in a well grown tree. The branches are few and thickish, but strong enough to resist any ordinary wind. The leaves hanging from long petioles are frequently over one foot in diameter, slightly pubescent, and more or less three-lobed. The wood is exceedingly light and spongy and may be used for corks; there is no heart wood whatever; the pith is very large, free from any fibre, and firm enough to also be used for corks. The bark yields a good fibre which may become a staple product some day. And the whole plant is filled with a mucilaginous sap.

The unique flower is brownish on the outside, with a velvety surface, and creamy yellow within; its odor is heavy, but sickening. The sepal lobes and petals are five. The monadelphous stamens have spirally contorted and contiguous anthers, and the stigmas are twisted into a cylindrical body which is protruded beyond the somewhat campanulate corolla. The "length over all" of the flower is from four to seven inches and the width at the mouth is from three to five inches. These huge flowers are borne near the tips of the branches and always maintain, from bud to fruit, an erect position.

The fruit is a five-celled capsule about six inches in length by one in diameter. As soon as ripe the cells split open dorsally and disclose the compressed brownish silky wool which envelopes the very small seeds. These so-called "pods" are packed into bales and sold at a few cents per pound. The wool is readily removed from the capsule, but it is almost impossible to entirely free it from the seeds. The seed hairs have a "crinkliness" which adds to their value as a stuffing material and prevents wadding to a large extent.

According to the article quoted from *American Gardening* in THE PLANT WORLD for June, '02, our corkwood must yield the honor of being the world's lightest wood to *Leitneria floridana*. However, in the Bulletin of the Bot. Dept. of Trinidad, B. W. I., for January, '01, the specific gravity of *O. lagopus* is given as .120—only about *half* as heavy as the *Leitneria;* Goodale credits *Ochroma* with .25; now which is *right?*

As an ornamental the "Goano" is a success. Its quick growth, striking foliage and magnolia-like flowers combine to give it an attractive and interesting individuality. Indeed, we believe it will be famous before many years have passed. O. W. BARRETT.

MAYAGÜEZ, PORTO RICO.

THE DISPUTED LONGEVITY OF CERTAIN PLANTS.

Field work has been lacking in the case of several plants appearing in our eastern botanies as to their lease of life. I note a few which I have had the opportunity to study.

Schedonnardus paniculatus.—Britton and Brown say of the genus: "An annual grass." It is a small-rooted, probably short-lived perennial with us, starting quite early in the spring. No doubt it may be annual in localities.

Festuca octoflora.—Probably everywhere an annual, but with us a "winter annual." Last fall it covered the ground in large patches that remained bright green all winter, averaging about 2–3 inches high, and very dense. It is already up, October 10, and ready for business.

Hordeum jubatum.—This has commonly been called annual. Britton and Brown give no clue to the duration of the species, simply saying of the genus, "common or perennial grasses." It is a good perennial here, starting very early in spring, forming a dense tuft of 15–20 stems. It is fibrous-rooted and therefore probably short-lived.

Linum rigidum.—Britton and Brown say "perennial (?)." Gray says nothing. Wood, "Botanist and Florist," says nothing. With us it is a winter annual, reaching a height of four inches in the fall, without rosettes, and remaining perfectly green all winter, with its narrowly linear, thickened leaves. Just below and above the surface of the ground, the stem is studded with buds partly opened, showing the leaves and branches of next year's growth. It sometimes blooms all summer.

Solanum nigrum.—Britton and Brown say "annual." Gray's Syn. Fl. N. A. says "Annuals (at least in our climate)," which of course includes Nebraska. I never heard this disputed. This year my attention was called to the plain fact that it is a good perennial, here in the village grove. After collecting by pulling, I went again to prove my contention, and dug four plants with a spade, all showing last year's stubs plainly, and branching freely from a thichened root. I saw none that looked like annuals. Ours is very pubescent.

CALLAWAY, CUSTER CO., NEB. J. M. BATES.

THE WILD FLOWER PRESERVATION SOCIETY.

OFFICIAL ANNOUNCEMENTS.

MEMBERS OF THE SOCIETY ARE REQUESTED TO READ THE FOLLOWING PARAGRAPHS WITH CARE.

Section 2, of Article VIII, of our By-Laws, is quoted entire:

"Elections of members to the Board shall be conducted as follows: On or before October 1 of each year, the outgoing Board shall prepare a list of not less than two nominations to each vacancy, and shall print the same in the next issue of the Society's official organ. Any ten or more members of the Society may thereafter file with the Secretary additional nominations, the revised list being printed in the succeeding issue. Members may then forward their ballots by mail to the Secretary at any time before the date of the annual meeting in December, the polls closing at 12 M. on that day. The four or more persons receiving the highest number of votes shall be declared elected as members of the Board of Managers."

The terms of the following Managers expire this year: Dr. L. H. Bailey, Mrs. N. L. Britton, Miss Alice Eastwood, and Mr. E. L. Morris. Miss Eastwood, owing to pressure of other duties, has expressed a wish to withdraw from the Board. The following eight persons have therefore been nominated by a majority of the Board as the official candidates:

*Dr. L. H. Bailey, Cornell University.
*Mrs. N. L. Britton, New York Botanical Garden.
*Mr. E. L. Morris, Central High School, Washington, D. C.
Professor C. F. Wheeler, U. S. Department of Agriculture.

Mr. C. E. Waters, Johns Hopkins University.
Mr. C. F. Saunders, Philadelphia, Pa.
Mrs. C. A. Hoyt, Pasadena, Cal.
Dr. H. H. Rusby, New York Botanical Garden.
*Renominated.

Under the terms of the By-Law above quoted, additional nominations in writing, signed by at least ten members, may be submitted to the Secretary up to the time the next issue of THE PLANT WORLD goes to press. Such nominations should, however, be restricted to those who are already members of the Society or who may have expressed their willingness to become members.

The annual reports of the officers and of the Board of Managers will be published in the next issue.

CHARLES LOUIS POLLARD, *Secretary*,
1854 Fifth Street, Washington, D. C.

GENERAL ITEMS.

The State of Washington may become in time a formidable competitor of Holland in the raising of bulbs. The people of Whatcom have found the land and climate well suited to this form of floriculture. Elmer E. Johnston, the Washington Commissioner to the World's Fair of 1904, reports that George Gibbs, of Whatcom, has conducted experiments with flowering bulbs such as crocus, hyacinth, narcissus, tulip, iris, jonquil and the like for several years, and claims that the climate of western Washington is peculiarly adapted to the growth and culture of such plants. For over one hundred years our florists have imported their bulbs from Holland. Millions of dollars leave the country annually for this purpose. It is the boast of Holland that such bulbs can be grown in no other climate in the world. Mr. Gibbs claims that the climate of the United States outside of western Washington is unsuited to their growth, but that he has fully demonstrated the product of the Puget Sound region fully equals that of Holland. Bulbs from Whatcom will be a part of the Washington exhibit.

A useful lesson is afforded by the bergamot as to the employment of common names. Botanists complain of the trouble they have to identify plants under these names, yet take little pains to ascertain priority, but adopt whatever the fancy of the moment may suggest. Thus Dr. Gray, in his "Synoptical Flora," employs the name "horse mint" for the whole genus; while but one species, *Monarda punctata*, is so designated by common people. Britton and Brown, in the "Illustrated Flora," class most of them as "bergamot," which is really the most generally accepted of any by the people, yet excluding *Monarda didyma*, which of all in gardens is known as the bergamot plant. However, the term bergamot is applied in some form or another to most of the species, though, as in the one now illustrated, the peculiar scent implied by the name is confined to but a few. Bergamot, in pharmacy, is obtained from the rind of a species of the lemon family, and is known as the oil of bergamot. This odor is especially characteristic of *Monarda didyma.—Meehan's Monthly.*

In the old time, bold and forceful men delighted to be known as countrymen, says *Country Life in America.* The great cities had not yet arisen. Great commercial opportunities were few. Men lived on their estates, and they built generously and broadly. Their places were homes in the best and truest sense, with which the very life and welfare of the family were interwoven, not mere summer houses built as adjuncts to city life. Often these men went into the very wilderness, "took up" many acres along water-courses or on lakes, and established places that marked the highest intellectual and social attainments of the region, and which to this day remain as land-marks. If the family was one of culture and means, a home-garden was a part of the establishment. Often this garden was more than a place in which merely to grow vegetables and pleasant flowers. It was an entity, wholly aside from the plants that it grew. It was laid out as a permanent feature, and usually with such a half pretense of formality as to insure respect on the part of the beholder. Buildings could be moved and repaired, but the garden was inviolate.

NOTES OF CURRENT LITERATURE.

Two contributions from the Gray Herbarium of Harvard University have recently been published, one on the flora of the Galapagos Islands, by Dr. B. L. Robinson, and the other a discussion of the European white birch (*Betula alba*) and its allies, by Mr. Merritt L. Fernald. Dr. Robinson's work, which is the form of an annoted list, is a carefully executed and most admirable treatise. It contains a very large amount of interesting reading matter in addition to the flora proper, including discussions of the topographical and physiographical features of each island in the group; of the various plant formations; and of the endemic plants. There is also a comparison with the flora of the adjacent mainland, Altogether the work is an eminent example of what a local flora should contain in order to meet the demands of modern taxonomic study.

We regret that it is impossible to speak in commendation of Mr. Fernald's work. It is characterized by a jumbling together of species wherever there appears to be a similarity of characters, no attention whatever being paid to geographical considerations. On the other hand, many so-called varieties are recognized, a practice resulting in fully as many names, even though grouped under one specific head. One illustration may serve as an indication of the general style of treatment. After explaining that the cones of *Betula nana*, a species of Greenland, northern Europe and Asia, have deeply 3-lobed scales, and that those of what has been called *B. Michauxii*, confined to Arctic America, "are made up of simple oblong scales," Mr. Fernald unites the two because he finds a single specimen from Greenland having both simple and lobed scales! The biological facts in the case, we think, scarcely warrant such unsound conclusions. If all species showing the slightest intergradation are to be united we may as well cast to the winds all considerations of ecology and morphology and return to the Linnaean taxonomy.

Mr. Fernald's introduction bears many evidences of too hasty preparation, for on no other hypothesis can we explain such a sentence as this. "The examination of the birches by the writer has led to the uniting of some well-known American and Old World trees and shrubs." By what process other than grafting can any human being unite two trees or shrubs? And what is meant by the expression "circumboreal regions?" We fail to find any authority for the supplanting of the well-known word "circumpolar" by this meaningless word. It is to be regretted that the care and study which Mr. Fernald has evidently bestowed on the material at hand has not aided him to establish a more rational systematic treatment of the birches. C. L. P.

EDITORIAL.

During the latter part of 1901 the scientific world was electrified by the announcement that Mr. Andrew Carnegie had donated the sum of ten million dollars for the founding of a great institution to be located in the City of Washington. Among the aims as set forth by the donor are: (1) to promote original research; (2) to discover the exceptional man in every department of study whenever and wherever found, inside or outside of school, and enable him to make the work, for which he seems especially designed, his life work; (3) to increase facilities for higher education; (4) to increase the efficiency of the universities and other institutions of learning throughout the country; (5) to insure the prompt publication and distribution of the results of scientific investigation.

The scope of these avowed aims is seen to be very novel, and will permit of activity along many lines. The eminent board of trustees have not yet announced a policy, and as a means of obtaining opinions from the scientific world have framed a letter asking for suggestions. While it is easy to see many avenues opening for fields of profitable activity, we may confine ourselves to a few that are naturally suggested in botany. It has been estimated by reliable authority that not one-half of the living flora is known to science. Systematic botanical exploration of old, as well as new or little known, regions might be profitably undertaken. Nothing like a final attempt at classification can be made until all plants are known. In this connection the outlining and defining of life areas might be begun. This is so closely connected with the interrelations between plant and environment, that plant physiology, as well as soil and climatic conditions, must be thoroughly studied. Thus one subject leads on to another, until it would be easy to plan work that would absorb the entire income of this gift, vast as it is.

As fields of lesser magnitude we might suggest the assistance of various monographers of groups of plants to complete and publish their work; the exploitation and study of fruit plants; and the study of special problems in histology, morphology or physiology.

BOOK REVIEWS.

THE BOOK OF THE STRAWBERRY. By *Edwin Beckett.*
THE BOOK OF CLIMBING PLANTS. By *S. Arnott.* John Lane: The Bodley Head. London and New York. Price, $1.00 each, net.

Under the general heading of *Handbooks of Practical Gardening,* John Lane (London and New York) is issuing a series of horticultural guides, the compact little books before us being numbers IX and X of the series.

The Book of the Strawberry, as might be inferred, deals almost exclusively with the English methods of propagation and culture. It is stated that the stock whence most of the best English varieties originated is the *Fragaria Chiloense,* while most of the American varieties are from *F. Virginiana.* The conditions of climate and temperature in England are so different from American conditions that the methods of culture are, in general, quite unlike ours. This book should prove of great value to English growers, and American producers will do well to read it, also, especially the pages treating of culture under glass. The book also contains short chapters on the Raspberry, Blackberry, Loganberry and Japanese Wineberry.

The Book of Climbing Plants will undoubtedly find a wider audience in this country than the other, although the species selected and method of handling them are somewhat different. Enumerating chapter-headings will best convey an idea of the scope of this little work. The subjects treated are as follows: Soil, Planting, After-Management and Propagation; Annual Climbing Plants; Hardy Deciduous and Herbaceous Climbers; Hardy Evergreen Climbers; Hardy Wall Shrubs; Climbers under Glass; The Rose as a Climber; The Clematis as a Climber; Selections of Climbing Plants and Wall Shrubs.

"It seems unnecessary to speak at length of the value of the climbing plants in our gardens and pleasure grounds. They are equally ornamental on the walls and terraces of the stable, mansion, and on the humblest cottage, over whose low roof a mantle of rose or clematis sheds such a transforming cloud of beauty. They grace the garden walls and take from stiff and hard lines their ugliness by fresh foliage, pretty flowers, and often pleasing fruit." [Introduction.]

These books are beautifully printed on heavy calendered paper and are quite fully illustrated. They should be in the library of all horticulturists. F. H. K.

THE PLANT WORLD

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OFFICIAL ORGAN OF THE WILD FLOWER PRESERVATION SOCIETY
OF AMERICA.

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MUSHROOMS.

By A. M. Longenecker.

THERE is an apparent hatred, at least a gastronomic prejudice, against a group of plants which embellish our lawns, fields and forests. This group of plants is known commonly as the mushrooms. Very few persons undertake to investigate these little plants, yet when one begins a study of them there dawns upon him a field of real interest, both intellectual and utilitarian. Many believe that a study of these fleshy products of Dame Nature belongs wholly to natural science, and can only be pursued by the skilled scientist; others deem it almost suicide to touch mushrooms. Let us at once lay aside this prejudice and enter into more pleasant relations with our little mushroom friends.

Birds, insects, flowers, trees, stones, all are becoming themes for the intellectual man; why not mushrooms? The reason no more attention is paid to the mushroom world, is that nearly all are said to be "poisonous stuff" and not to be touched. Let us take the diametrically opposite view and state with the utmost sincerity and with experience in this line of work, that only a comparative few of our mushrooms are poisonous and that most of them are edible. We also often hear the statement that there are mushrooms and toadstools. The toad may have, at some time in the mystic past, used these little plants as croaking pillars, but they no longer in an enlightened world attempt such feats. There are no toadstools—unless we say that all mushrooms are toadstools, but in such a case we must also say that all toadstools are mushrooms.*

We have between eight and nine hundred different species of mushrooms in the eastern part of the United States, and of these at least six hundred and fifty have been proven edible by students of the mushroom world, leaving only a small number as poisonous, and of the condemned ones some will sooner or later be proven edible.

A frequent question is, which are poisonous and which are non-poisonous? We are sorry to state that no rule can be given that will separate the poisonous from the non-poisonous ones. Various attempts have been made to give a rule or rules to separate the good from the bad, but such rules are too often worse than worthless. The only way by which we can determine the quality of anything is—test it yourself, or allow some one else to do it for you. In other words, a mushroom is found good or bad by allowing it to pass through one's own stomach, or else by noting its effect upon some lower animal. This may seem criminal at first thought, yet not so when we find that very small pieces of mushroom can be eaten, even of the poisonous varieties, without fatal results. Thus, when you wish to test a mushroom, take a small piece of the one in question, eat it and note the results; if it makes you feel ill, leave it alone and label it as poisonous. A few of our mushrooms are poisonous to some people and non-poisonous to others. In case no bad effect is produced by eating a small piece, eat a larger piece and again carefully note the results. Care should be taken in not increasing the doses too much at a time, or else injury may result from so doing. The smell and taste of any species of mushroom is by no means a criterion, for some have a very pleasant taste and yet are deadly poisonous; others are unpleasant to taste and smell, but are after all very delicious when properly prepared.

Our friends also frequently ask us, "which are the best species?" To this query we would reply—that the deliciousness of any mushroom depends largely upon the idiosyncrasy of the individual. Some persons consider tomatoes a great and important dish; others find them pleasing only at a great distance. Some prefer sour apples, others sweet ones, and so on through the whole list of different articles of diet. The common Morchellae, found about apple stumps, walnut stumps, and on ashes and cinders, are considered a great luxury in our vicinity, even amongst those who doubt the good qualities of hundreds of other varieties. The beefsteak mushroom, which grows from trees, roots and stumps, is highly esteemed by the writer and his friends. It can be found in August and September, growing like large tongues from trees or stumps; it has a red or yellowish-red hue on the top and when young it is very viscid. It is called the beefsteak mushroom on account of its supposed food value. In the vicinity of our town and in the Mt. Gretna hills, a hundred pounds could be collected any day. The whole plant can be utilized, not even omitting the slippery or viscid mass found on the top of the flesh of young plants. The flesh contains thick fleshy fibres running parallel to one another. It is a beautiful object and worthy of attention in its wild haunts. Another mushroom highly esteemed by many, is the horse mushroom or the plowed land mushroom. It is found in pastures and plowed lands—most abundantly after rains during summer and early autumn. Its upper surface is white or yellowish, having a mealy or scaly covering; its under surface (called gills) is at first white, then pink, and finally black. It also has a ring hanging down from the stem, and it is by these features that it can be soon recognized and identified by any novice. Space will not permit us to mention more species of high food value, but suffice it to state that hundreds more have just as high a food value as any of these already mentioned.

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*NOTE.—The term mushroom is generally applied to supposedly edible species and the term toadstool to supposedly poisonous species.—ED.

In a study of our more ordinary forms of mushrooms a few interesting features can be learned by every one, and not confining ourselves to the technicalities found in a study of this kind, we will give a few very common facts regarding the structure of the three great families of mushrooms.

In figures 1, 2 and 3, we represent the typical sections—plant cut from top to bottom and looking at the plant directly in front of your eyes. These three large families are called the gilled, tubed and spined mushrooms; the letters e, f and g, respectively, representing the gills, tubes and spines. These gills, tubes and spines, are the portions of the plants that bear the spores or seeds. These spores are very small and can not be seen individually with the naked eye. Every mushroom has a cap, represented in the figures by the letters a, b and c. The letter represents the stem. Fig. 1 (h) represents the ring which before rupturing is fastened to the skin that runs over the margin and edge of the gills. The letter (i) in Fig. 1, represents the volva. Never eat or be induced to eat any mushroom which looks like Fig. 1—that is, never eat a gilled mushroom which has a ring and a volva—unless told to do so by some excellent authority, for we know

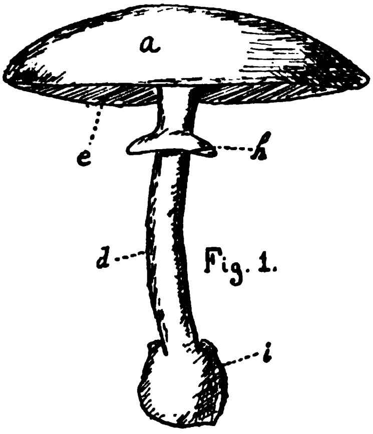
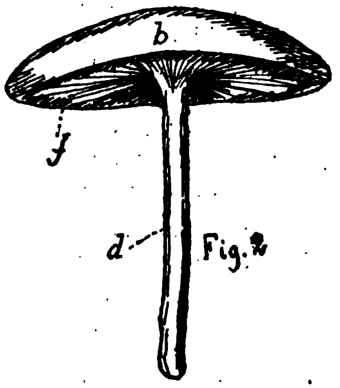
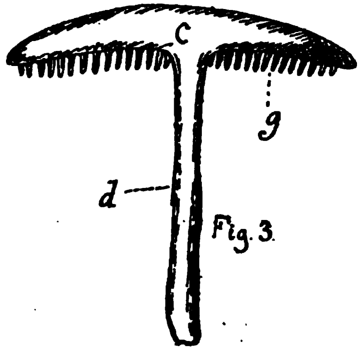


Fig. 1.

that ninety per cent. of all the deaths due to mushroom poisoning result from eating plants belonging to this group. There are many good ones amongst them, even the best, but also the most deadly.



Another very interesting and instructive feature is found in the spores of the mushrooms, which can be studied without the aid of a microscope—an instrument which, however, adds beauty and interest. Take any mushroom accessible, cut off the stem near the cap, lay it upon a white sheet of paper, with gills, tubes or spines resting on the paper. Then cover it with a bowl or dish, leave it for about six or eight hours and note the result. The result will be a deposition of spores. The moisture of the cap will fill the bowl or dish, causing the spores to ripen and drop down upon the paper. The spores are usually divided into five classes—white, pink, brown, purple or black. The white spored series is by far the largest and most common. By first applying a weak solution of gum arabic to the paper and drying before depositing spores, you will get a sheet upon which permanent spore prints can be made. The white spored series will show better, however, when a dark colored paper is used for receiving the spores.



Among the most striking forms of mushrooms found in forest or field is the chlorine mushroom represented in Plate XXV, Fig. 1. It is one which the writer and others often find by the sense of smell. It is a handsome species, certainly a king of the forest, with his royal carpet, moss and leaves, and his retinue, his sister mushrooms, to keep him company. The central specimen in the photograph measured fourteen inches and weighed fifteen and a half ounces. It belongs to the deadly genus, but happens to be one of the species whose edible qualities rank high. It has a stout 'root' penetrating the earth, sometimes to a distance of seven inches. It has a very strong smell of chlorine, but this dissipates as a gas when cooked.

The milk and pepper mushroom, so abundant in nearly every forest, is one that can be soon recognized. It is represented in Plate XXVI, Fig. 1. It is called milk mushroom, because, when wounded, a white-colored

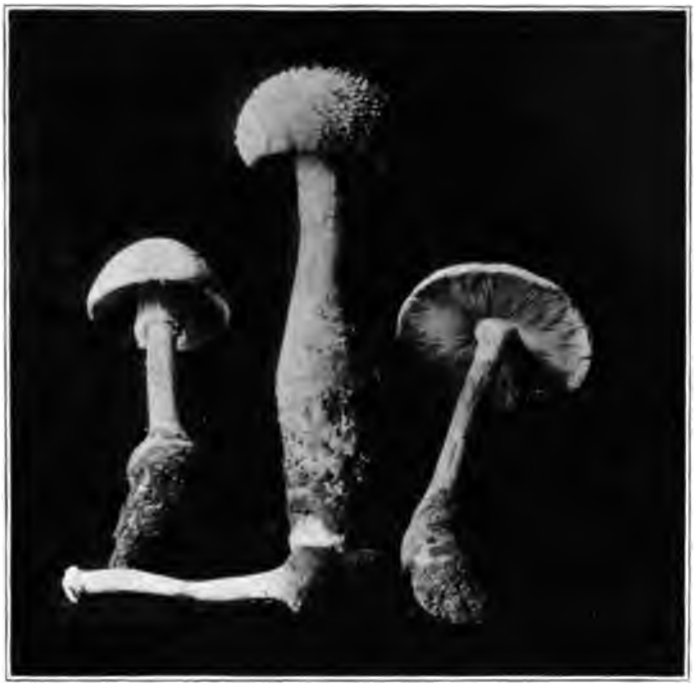


FIG. 1. The Chlorine Mushroom.

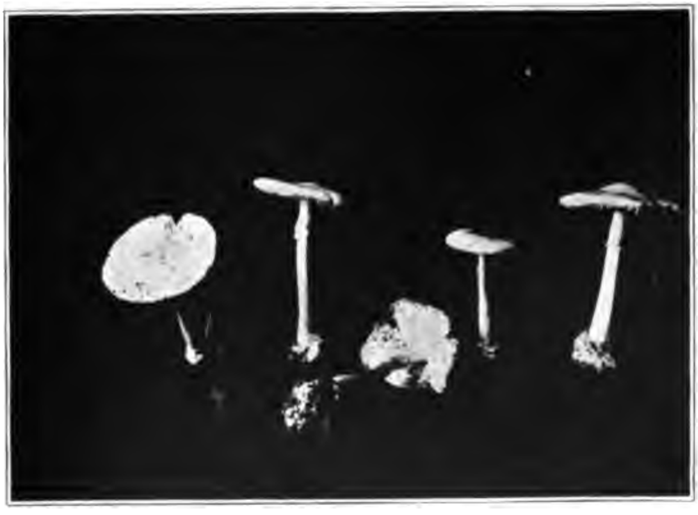


FIG. 2. The Death Cup.

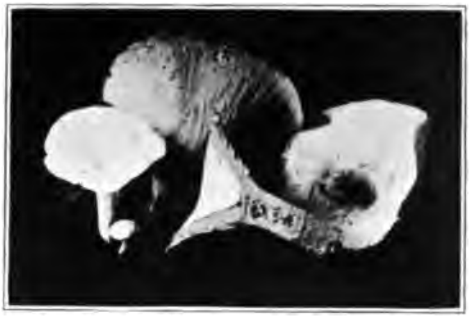


FIG. 1. The Milk and Pepper Mushroom.

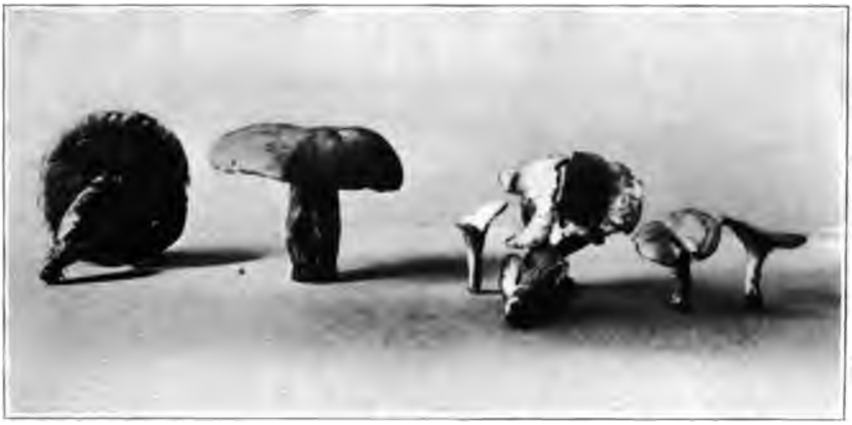


FIG. 2. The Lurid Boletus (on left). The Fragrant Cantharellus (on right).

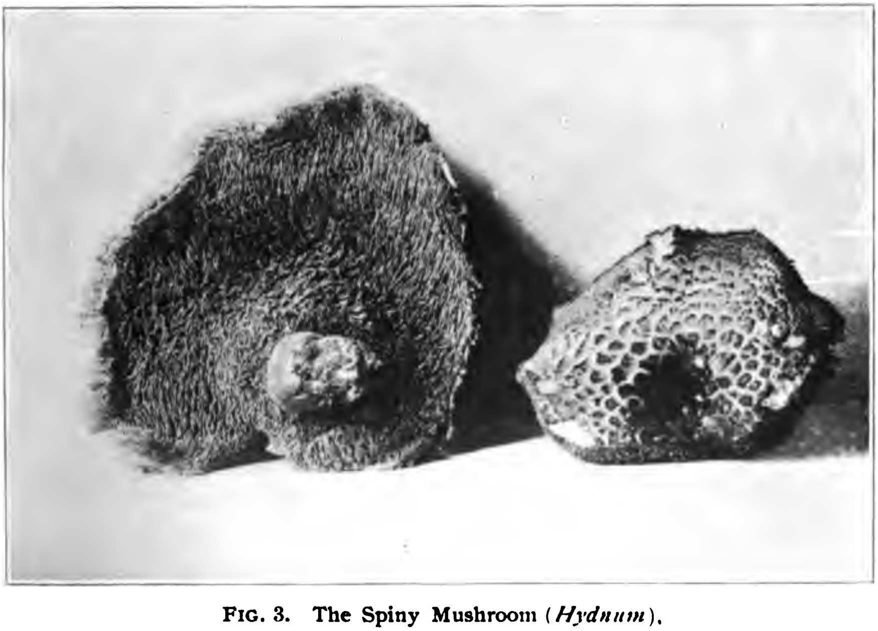


FIG. 3. The Spiny Mushroom (*Hydnum*).

fluid freely flows from it. The milk has a very sharp and pungent taste, like that of red pepper. There are many kinds of milk mushrooms, mostly having white milk, but one is called the indigo mushroom on account of having an indigo blue color, and emitting when wounded an indigo-colored milk. Nearly all the species of milk mushrooms are edible, and the peppery taste is lost in cooking.

The phosphorescent mushroom will never fail to attract the attention, even of the least intelligent observer. It has a deep yellow color, and grows in bunches from the ground beside stumps and trees. One bunch was found by the writer, on the Mt. Gretna hills, that contained forty-two specimens. The most interesting feature of this is that its splendor by day is highly magnified by night. In taking this bunch into a dark room, its real wonder only became apparent; it emitted light enough on one occasion for us to read a book by its side. It is one of the ghosts seen by superstitious people on dark nights, but harmless as all ghosts usually are. It also generates heat; for when a thermometer is placed in a bunch of these plants, a rise of several degrees can be noticed on the scale, or on passing a hand through a large bunch is like passing the hand over a warm stove. The only unpleasant feature about this wonder of nature is that it is slightly poisonous.

Plate XXV, Fig. 2, represents the mushroom called *Amanitaphalloides*, which is a deadly poisonous one. It has apparently caused more trouble than all the rest combined. It has a noble bearing, ring and volva present, a white, yellowish or brownish hue, and is usually found growing where the environments for mushrooms are good. Very often it intrudes upon the grounds of the good varieties and thus those who are not careful enough or are unacquainted with the foe, get it mixed with the good species. Thus, again heed our advice: Never collect mushrooms for eating until you are perfectly acquainted with the one or ones you are collecting, and never collect one with both a ring and a volva. Let not this precaution deter you from a study of the wonderful world of mushrooms, however. Men are either good or bad, but the fact that some men are bad is by no means a reason for us to shun all humanity and not mingle with the good. The same argument can be presented for mushrooms.

A mushroom reproduces itself by spores. These spores are very numerous in one plant—millions of spores being found in each plant, and should they all germinate, our forests would be covered with one mass of these fleshy organisms. The spores drop to the ground, are washed about and down into the earth. They remain in the ground for one year, during which time they germinate, push forth cell by cell until a very intervoven and intricate net work or fibrous mass is formed. Upon this mass, which covers considerable ground, is forced a little bulb or bulbs, and when the proper conditions of heat, moisture and nourishment are present this little bulb pushes forth its head and expands. The duration of the plant when out of the ground varies, depending altogether upon the location, exposure to heat, light and moisture. Some have been observed to flourish only for a day or two, others last for a week or even longer. The more leathery species growing on stumps may endure even for months. No month of the year is without some form of mushroom.

There is hardly a place upon our earth that is without some forms of mushrooms; lawns, gardens, fields, forests, on trees, stumps, decayed wood, rocks, decayed leaves, cellars—all are their camping grounds. Yet each of the above named places furnishes its own peculiar conditions for some modification of these little plants. Some have a white color pervading the whole plant; others are wholly red, yellow, blue, amethyst, vermillion, cinnamon-color or salmon hued, and it requires an expert in color to name every hue presented by the different forms. The lurid mushrooms and others have the peculiar property of the chameleon: they change their color when touched or wounded. Some are purely white or red, but when broken the flesh changes from white to blue, red, green or brown. To the left, in Plate XXVI, Fig. 2, is represented one which has a dull red hue on the outside and a purely white flesh; yet when broken, the flesh turns very rapidly to blue.

The taste and smell of various spices is as far diversified as the color. On the right in Plate XXVI, Fig. 2, is represented one which has the smell of almonds. Others have the smell of garlic, camphor, radishes, dried meal, chlorine, chloride of lime, and the stink-horn expels any intruder upon its seemingly forbidden grounds. The fly mushroom has an attractive odor for flies, but its deadly poison proves fatal to them.

The wondrous hand of divine nature even pervades these little plants, ennobling us for our inquisitiveness, and these dainties, so much neglected, still adorn forest and field as they did when plucked to grace the dinners of Roman emperors. They still are an almost absolute necessity to complete the menu of a Parisian gourmand and should amongst us at least receive some attention when we are roaming over nature's wonderful field.

MANHEIM, PA.

ORIGIN OF PLANT NAMES.*

By Grace Niles.

III. THE COLUMBINE.

THE demand of the general public to dispense with technical names in the pages of nature books is evidently a sign that the popular interest is but a passing fancy on the part of flower lovers, since they care not for the hidden story beyond the common names, which in reality originate the Greek and Latin designations, so full of classical beauty.

> "The poetical mystery of the flower
> That sleeps in the origin of its name,
> Is like the hidden roots of Ovid's lily,
> That nourishes its fragrance, and feeds its flame."

The ancients referred to the lilies as pure white like those original roses of earth. Ovid's lily, known also as *Martagon* and in Latin *Lilium rubrum* or *rusum,* bore from twenty to thirty flowers of a rich orange-red or blood color. Ovid wrote that Apollo and the boy Hyacinthus were playing, when Apollo, by misfortune, threw the youth. The grass and herbs about thus became sprinkled with the child's innocent blood, whereupon Apollo immediately commanded that flowers arise; and Earth brought forth a flower resembling a white lily save that it was red or ruby toned, which Apollo perpetuated as *Hyacinthus,* afterward known as *Martagon* and *Lilium rusum.* The pure white lily of the ancient Grecians was known as *Rosa Junonis* and *Lilium album,* or in French as *Lys blanc,* which became in English our Easter lily of to-day. It was very beautiful and fragrant, likened to a cathedral bell, "out of which there groweth a long triangular stem in the center, surrounded by six small tongues like to the clappers of a bell."

Constantine wrote of this lily and remarks that Jupiter desired to make his infant Hercules immortal, and thus took him to nurse his sleeping wife Juno. The infant Hercules having received his portion of immortal life fell asleep and Jupiter departed with his son. Yet the immortalizing life of the slumbering Juno flowed on and was spilt in heaven, falling upon the skies, whereof the sign and marks remain even to-day in the "milky way" that flows through the heavens from north to south. The rest fell upon earth, and from it there sprang up these pure and immortalized Easter lilies, milky-white in color, that indeed seem descended from heaven!

The origin of columbine and honeysuckle are deserving of interest. Indeed, there are many curious attempts made by botanists to get at the truth of "what's in a name!"

Professor Greene and Mr. Saunders, in former issues of The Plant

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* Continued from October issue.

WORLD, have written upon the origin of the word *columbine*, but have failed to arrive at what seems to the writer the true derivation of the name. Mr. Saunders went wide of the mark in his "dove-cote" theory, while Professor Greene also did not satisfactorily establish his theory of dove's-foot as the original of *columbine*. Since, as he says, the Latin name *dove's-foot geranium* was *Pes columbinus*, he believed the prefix *Pes* would likewise appear before columbine, the common name of *Aquilegia*, which is an inference rather than a fact. The generic name for columbine is *Aquilegia*, vaguely assumed to have originated from the resemblance of curves of the hollow spurs of these flowers to those of an eagle's talons. Dodoens wrote of these flowers under the name of *columbine*, and remarks that they were known to the ancients in Latin as *Aquilegia* or *Aquileia*, and by later writers *Columbina*. It is called in English, according to Henry Lyte's translation of Dodoens, 1578: "*Columbine*, of the shape and proportions of the leaves of the flowers, which *do* seem to represent the *figure* of a dove or culver. In French it is *Ancholy;* in High Dutch, *Agley;* in Low Dutch, *Akeley*." *Columbine*, therefore, appears to have originated in England from the Latin *columbinus*, signifying *dove* or *culver*.

So far as I am able to discover in the pre-Linnaean botanical literature, columbine was *not* applied by the ancients to species of *Aquilegia*. The group of plants comprised in the genus *Geranium* produced many species resembling birds' feet and bills. Herb-Robert, pink-needle, storks, or crane's-bill, are closely allied with species of *Aquilegia* of the ancients. *Aquilegia* and columbine may, therefore, have become later confused with the Geranium family in England. There is a species of *Geranium* perpetuated by Linnaeus in the old binary nomenclature, as *Geranium columbinum*, commonly known as long-stalked crane's-bill, which the long seed-pod resembles. This species was first known as *Geranium alterum* and *Pes columbinus*, which becomes in English, *dove's-foot geranium;* in French, *Pied de pigeon*, and in Low Dutch, *doyvennoet*. Dodoens wrote of the group of *geraniums* known to the ancients, and says: "These herbes of the first sort have seeds, long and sharpe like a heron's-beake or bill, or storke's-bill, with leaves cut and jagged in many places like crow-foot flowers." It is true the Crow-foot family to-day includes these cut and jagged leaved plants, such as buttercups, columbine, larkspur, caltha, clematis, anemone, hepatica, etc. The second species of geranium known to Dodoens was *Geranium columbinum*, known as *Pes columbae*, or dove's-foot geranium, and "produced leaves like the mallow, cut around about, growing on tender hairy browne stalks, and the flowers be small, of a cleere purple color, and the seed pods turn into little bills, yet not so great as the crane's-beek or storke's-bill geranium (*Geranium tuberosum*) of old."

The Latin prefix *Pes* signifies *foot* in all instances, a few of which I will cite: The plant known as gander's-foot is known in Latin as *Pes anserinus;* in French, *Pied d'oyson,* commonly known also as swinebane, since it kills pigs if they eat the plant. Herb rue or crow-foot plantain was known in Latin as *Pes cornicis.* A certain moss-like plant was called wolf's-claw, since it grew tenaciously, taking grips with its "claws." The origin of the ancient Greek on Latin was unknown to Dodoens, who translated the popular name into the Greek, *Lycopodion;* in Latin, *Pes Lupi;* in English, wolf's-claw, and in French, *Pied de Loup.*

The English plant known as ladies' mantell, great saincel, and *Pad de lion,* from the size of the round leaves, was called by Dioscorides *Pes Leonis;* in English, lion's-foot, and in French, *Pied de Lion.* There was also a species of crowfoot of the ancients called cock's-foot, hen's-foot and leopard's-foot, or golden grow-foot, known in Latin as *Pes Leopardi.*

The English hare's-foot (*Trifolium humile*) of old, was also known in Latin as *Pes Leporis.* The calf's-foot or *Cockow-puit,* blooming in March and April, was in Latin *Arum* and *Pes Viruli.* The Egyptians called it *Colocafia,* signifying calf's-foot. In England, it was also known as wake-robin and calf's-foot, and in French, *Pied de veau.*

The species of *Aquilegia* do not seem to afford an instance where the prefix *Pes* occurs before the generic or common names suggestive of eagle's-foot or dove's-foot. Therefore, *Columbine,* the common name for species of *Aquilegia,* does not refer to other than simply *dove, culver* or *pigeon.* The name *Pes columbiae* belongs especially to the dove's-foot geranium, and never was known to apply, as far as I can discover, to the true columbine. The origin of *Aquilegia,* pertaining to an eagle's-talons, is not as yet clear to me. Under *Columbine* I observe that Dodoens describes *Aquilegia* as resembling a lark's-claw instead of an eagle's talons. "The stalks be rounde and plaine, or smoothe, of two or three foote long upon which grow floures compact of two kinds, of little leaves, whereof one sorte are small and narrow, and the other growing with them are hollow, with a long crooked tayle like larke's-claw (a name for our common larke's-spurs and bending somewhat toward the proportions of the necke of a culver or dove). The floures are sometimes single, and sometimes double, and sometimes of a colour blew, sometimes white, sometimes skie colour, sometimes red, and sometimes speckled, and intermingled with blew and white," growing in high woods and rocky places, and sometimes cultivated in German gardens. "The vertues of these floures," according to Doctor Ruellins, had "no uses in medicine." Yet Dodoens and other writers, says Lyte, "*do* affirme that columbine (*Aquilegia*) is good against the jaundise, and inflammation of the windepipe." Properly speaking, therefore, these species are dove's or culver's-neck instead of dove's or eagle's foot.

The columbines of the genus *Aquilegia* belong to the Crowfoot family (Ranunculaceae), in common with clematis, or virgin's-bower; anemone, or wind-flower; hepatica, or liver-leaf; meadow-rue, false bug-bane, monk's-hood and larkspur.

(TO BE CONCLUDED.)

A SUMMER OUTING IN IOWA.

By CHARLOTTE M. KING.

IT was our privilege to visit, during the summer of 1901, a few points in Iowa of rather exceptional interest from the standpoint of plant distribution.

Near Steamboat Rock, in Hardin County, is one of the few pine-tree regions of the state. North of the town the Iowa River threads its way along the edge of the Altamont Moraine, with barriers of hills on either side. A moisture-bearing stratum, a few feet above the level of the stream's bed, accounts for numerous springs and marshes along its course. Southwest of the town rise bluffs of red sandstone ninety feet or more in height; along the base of these the stream continues on its way.

In favorable seasons, as one may suppose, the vegetation of this strip of wooded country bordering the Iowa River is varied and abundant; although here, as over all parts of Iowa, the cattle pastured are destroying natural conditions, and injuring the woods to an alarming extent. The bed and shores of the stream afford a characteristic example of aquatic vegetation; the hill-tops and prairie borders have drought-enduring forms; while intermediate plant-formations lie between these two extremes. The richest locality is, perhaps, the "Fern Glen," with its floor the bed of fallen and disintegrated sandstone from the impinging cliff; below the glen the river flows over a rocky bed. The extreme dryness of the season was favorable to the water plants only; in the lowered stream the *Potamogeton*, *Chara* and their associates thrived in abundance.

Along the brow of the cliffs and on steep northern exposures, is the white pine standing alone or in groups and growing to considerable size. Dr. Pammel records this as the western limit of this tree in Iowa. Associated with it is the paper birch and cherry birch.

The glen is so shaded by the overhanging cliffs and the birches, that it has become carpeted with ferns and mosses. Here is growing *Lycopodium lucidulum*, a club moss common further north and east, but very rare in the State. Among the ferns *Aspidium marginale* is common, a very rare fern in Iowa. The graceful *Cystopteris bulbifera* and mosses climb the cliffs where they find moisture and foothold; above them *Polypodium vulgare* and lichens are doing their share toward modifying the surface of the rock.

In many shaded and damp places *Impatiens fulva* is growing vigorously. In a marsh north of the town grow the large pink moccasin flower, *Cypripedium spectabile*, and *Habenaria flava*, amidst deep mosses. The *Juniperus communis* is found in this vicinity. On a steep northern bank bordering the stream is a clump of *Betula lenta*, the cherry birch. From this locality Dr. Pammel lists fifty-one shrubs and trees, among them not already mentioned are *Juniperus Virginiana*, *Betula lenta*, and *Populus grandidentata*. This last tree has taken possession near the head of one ravine, and the trees have grown to a height of 50 to 60 feet. North of the town the "Calamus pond" forms an excellent illustration of the gradual filling of such standing waters by encroaching vegetation. Of the several acres once constituting the area of the pond, a large part is now given over to reeds, cat-tails and arrow-leaf; the calamus and white water lily are both found in this neighborhood. Near one spring is a beautiful growth of cress, introduced a few years ago. In the woods the yellow bush-honeysuckle (*Lonicera Sullivantii*) is quite common. As has been indicated, the exceptional plants of this region are northern forms, and their occurrence is peculiar in its isolation.

The region of the Altamont Moraine in countries further north has hills and depressions characteristic of an ice-sculptured country. The hills are rounded and steep; the depressions frequently contain ponds or bogs, often peat-filled. The black margins of these ponds were dotted with the white bloom of two small species of arrow-leaf; whilst farther shoreward, reeds and rank grasses were growing. Occasionally the tall *Phragmites communis* lined the roadways. The streams throughout this part of the State are scantily wooded, the country being for the most part open.

It was the beginning of the season for Composites, and the sunflower family was preparing a fine exhibition. We were just too early for the blooming of asters and golden rod, which were vigorous and abundant.

The second pine region visited was Allamakee County, seemingly close upon the borders of the northern woods. This is in the driftless section of Iowa. From our stopping place, Postville, in the southwestern part of the county, a drive of nine miles brought us, by gradual descent, through two hundred feet of Trenton formation, to the valley of the Yellow River. In its erosion to the present channel the river has left exposed several groups of strata, thus affording variety in plants and groups of plants, as we pass up and down the bluffs and along the course of the stream. There was welcome evidence of much more moisture throughout this region; the woods are marked by larger size and greater abundance of trees, and by more ferns and mosses.

Professor MacBride, who listed the trees of Allamakee County, names forty-three trees and shrubs, all of which, with two or three exceptions, we found in our brief exploration along the Yellow River. The *Quercus Muhlenbergii,* a tree belonging further south, is found here.

At the point where the road strikes the stream, the valley is perhaps a mile wide, with bluffs precipitous and cañon like. The valley, before the windings of the bluff-line cut off the view, extends several miles east and west. This little piece of the "Switzerland of Iowa," here on the borders of the prairie, deserves its name, and with the sunrise and sunset to add to its charm, is certainly a beautiful spot. All through that part of the country the private groves of evergreens are so numerous and thrifty, that it was not a matter of surprise to find that Nature had set the example by a plentiful sprinkling of evergreens in the woods along the stream. Following the south bank of the stream going east, we come at once upon the *Taxus Canadensis* growing freely upon the limestone bluffs; here also some rock-loving ferns. About eighteen of the twenty or more different ferns of the state are found in this county, among them one fern usually more abundant in more southern regions, the beautiful *Phegopteris hexagonoptera.* Further down the stream, amongst the rocks of the steep hillside, is a heavy, fresh growth of *Taxus* with its red fruit, mosses, lichens and ferns holding considerable moisture even in August. Here the paper birch *(Betula papyrifera)* and balsam fir *(Abies balsamea)* are the principal trees; in the immediate neighborhood are the staghorn sumac (*Rhus typhina*), the purple trillium, Jack-in-the-pulpit and occasionally the ginseng, with its tiny crown of red-brown fruit. The firs grow not too closely, mingled with birches as they are, to assume very perfect form.

Along the northern side of the valley the prairie encroaches much closer; along the bluffs stand frequent pines, some very tall, far overtowering the valley. Their position is very much exposed to winter storms and summer heat, and they are somewhat weather-worn. These bluffs are clothed with grasses, and all along the ledges springs the cedar, *Juniperus Virginiana.* These bluffs are much more affected by the dryness of the summer than is the opposite side.

Two miles further down stream the current has cut its way into St. Peter's sandstone; whilst nearer the mouth the Oneota limestone is exposed, thus enlarging the variety of conditions in this region. Other trees than those already named, of unusual occurrence for Iowa, are mentioned by Professor MacBride as follows: *Alnus incanus, Betula lenta, Morus rubra* and *Acer spicatum.* As in our own woods of central

Iowa, the common oaks, elms, ashes, hawthorns, maples and cherries are everywhere.

The Yellow River has certainly many features of interest to the observer of Iowa woodland and prairie. An overland drive across the county of Allamakee takes one along a ridge, almost all the way, overlooking the country for many miles to both east and west. Thus one is afforded an excellent view of the distribution of woods along the streams. On both sides of the Mississippi River at Lansing are high rounded bluffs, with varied groups of plants, from water-loving forms along the river's edge, to those adapted to higher and drier locations. On the north exposures of the bluffs, and especially near the base, the woods are deep, with trees of large and vigorous growth. On rocks in these woods we find the interesting walking fern (*Camptosorus rhizophyllus*); here, too, stretch great fronds of *Osmunda Claytoniana*, group after group, fresh and woodsy, with the sunlight drifting in upon them. Along roadsides, and in more open places, the delicate hare-bell is common. From this locality, later in the season, came beautiful specimens of fringed gentian and golden-rod.

The three or four miles of water separating Iowa from Wisconsin flows about numerous islands; at some seasons many of these are in great measure submerged, but in August they form inviting botanizing grounds. A boat is the ideal conveyance for the botanist, for it brings to his hand the inaccessible, and carries all his burdens for him.

We ranged along the waterways, finding abundance of the blue lobelias (*Lobelia syphilitica*) and delighted with the cardinal flower's (*L. cardinalis*) brilliant touch of color, the great river-gardens of white water lily (*Nymphaea tuberosa*) and yellow nuphar (*Nuphar advena*). Little sandpipers continually moved along the margins of the sandbars, scarcely noting the passing boat.

Among the interesting water-plants we gathered is the *Azolla Caroliniana*. Here, too, we again met the arrow-leaf in profusion with its waxy petals, and *Zizania aquatica*, that stately grass. When in blossom this admirable and perfect plant rises like a wand at the water-side, crowned with bloom yellow with pendent stamens.

In these islands the student of ecology may see examples of the progress of vegetation formation, from those of the mud-flat and water's-edge to the more stable formations of the higher islands.

BRIEFER ARTICLES.

THE DWARF MISTLETOE AT MOUNT KTAADN.

The climatic forest type of the Mount Ktaadn district is the black spruce-balsam combination, in which the black spruce (*Picea nigra* Link) is by far the most important factor. In light of this fact there seemed no reason why the dwarf mistletoe (*Arceuthobium pussillum* Peck) should not occur there, unless climatically excluded, which seemed highly improbable, as Howe has recorded its occurrence as far north as Newfoundland.*

So it had seemed peculiar to the writer that the *Arceuthobium* had never been noted from this region, though visited by many botanical parties. Consequently, during a two weeks' visit to Ktaadn last August, a sharp outlook was kept for the mistletoe. Its characteristic appearance makes it almost sure of detection, so our search was not long without its reward. Gratifying was it on the seventh day of our visit, while following the trail from the South Basin down to Lower Basin Pond, to note its abundant occurrence along the trail, first appearing at an altitude of about 2740 feet, which was its highest station noted. At the mouth of Lower Basin Pond outlet an area of spruce some fifty feet square is completely infested with this little parasite, producing dwarf, gnarled, and scrubby growth, not unlike the *krummholz* (scrub) of the table land and higher slopes. Although the balsam (*Abies balsamea* Miller) was sparingly present, it was entirely free from infection.

Hull Botanical Laboratory, University of Chicago.

LEROY H. HARVEY,

AN OLD SPHAGNUM BOG IN LA CROSSE COUNTY, WISCONSIN.

About seven miles from La Crosse in the La Crosse Valley, between the Sand Hills, there formerly occurred a sphagnum bog covering twenty or thirty acres. These bogs are numerous further east and north in the State. There are none, so far as I know, to the south on the Wisconsin side of the Mississippi. This bog now, however, has disappeared owing to the cutting out of timber on the lands above the bog. The removal of the timber, consisting of *Pinus Strobus*, *Quercus tinctoria*, *Betulu papyrifera*, *B. lenta*, *Carpinus Caroliniana* and *Ostrya Virginica*, on the sandy uplands, and the cultivation of these lands has caused the once

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*Howe, C. D. Some Notes on the Dwarf Mistletoe, *Torreya*, 2: 8.

forested area to become so badly washed that deep gullies have been formed. Every freshet causes the removal of much of the soil into the bog, so that now the bog is covered with from two to four feet of sand, and the destruction of many rare plants for this locality.

From 1884 to 1887, I found the following interesting plants in this bog. Of the orchids, the *Calopogon pulchellus* was abundant, as well as the *Pogonia ophioglossoides*. On the wooded margins there were great masses of the large showy lady's slipper (*Cypripedium spectabile* Salisb.), and in the marshes surrounding the bog the purple fringed-orchis, *Habenaria psycodes*, and *Cypripedium candidum*. Last summer I found not a single orchid here. The showy lady's slipper was, however, found in a tamarack marsh below the old bog. This species, once abundant in many places in this vicinity, is becoming rare. Growing with this *Cypripedium* in the tamarack marsh there were great masses of *Osmunda regalis* and *O. cinnamomea*, the *Smilacina bifolia* carpeted the ground, with here and there bunches of *Valeriana sylvatica* and *Saxifraga Pennsylvanica*. The *Viola canina* var. *Muhlenbergii* and *V. blanda* were also abundant. The drying up of this tamarack marsh will in course of time also cause these plants to disappear.

In the old bog the following additional interesting plants used to flourish. I was disappointed not to find a single plant of any of these left. *Drosera rotundifolia*, glistening in the sun, covered the entire bog. *Eriophorum polystachyon*, *E. Virginicum*, *Rhynchospora alba* were abundant. *Vaccinium macrocarpon*, *Sarracenia purpurea* and *Salix candida* were common. The *Menyanthes trifoliata*, once abundant, was found here and there pushing its way up through the sand. Large clumps of the *Salix lucida* were found growing along the banks of the springs and small brooks. The *Salix longifolia* covered most of the old bog. Along with the *S. longifolia*, the *Phragmites communis* was abundant. The stagnant pools contained a luxuriant growth of *Typha latifolia* and *Scirpus lacustris*. Along the borders of the tamarack swamp there occurred a few isolated *Acer rubrum*. I had previously found the species in the Kickapoo Valley. This locality probably represents its western distribution in this section of the State. The tamarack (*Larix Americana*) occurring in the La Crosse Valley is probably the southwestern distribution in this State. Opposite La Crosse in the Pine Creek region there used to be an old tamarack marsh with a small grove. When I visited this locality in 1886, the old trees had been nearly removed, but there was a good growth of young trees. This marsh has probably disappeared. This locality, I think, represents the most southern distribution of the species in Minnesota. There are no trees of the species, so far as I know, native to the State of Iowa, 25 miles to the south. Among the other noteworthy plants surrounding these marshes, mention may be made of the cherry birch *(Betula lenta)* found on the sandy ledges. *Diervilla trifida, Pellaea gracilis, Phegopteris Dryopteris, P. polypodioides, Woodsia Ilvensis* and *W. obtusa.* The *Cornus stolonifera* is common throughout the region. The *Nemopanthes fasicularis* occurs sparingly in the marshes. The *Rhus venenata* is also not infrequent in tamarack woods. The *Cypripedium pubescens* formerly was abundant in one of the upland woods surrounding the bog. Here as elsewhere in this western country many of the rarer native plants are disappearing. In western Wisconsin there are many areas not suited for cultivation, but all available ground has been utilized, and ground that has not been utilized for cultivation is so closely pastured that many of our more delicate plants cannot survive the hard usage.

AMES, IOWA. L. H. PAMMEL.

THE WILD FLOWER PRESERVATION SOCIETY.

ANNUAL REPORT OF THE BOARD OF MANAGERS.

To the Members:—The Society was organized in New York City on April 23, 1902, and hence has been in operation considerably less than one year. Nevertheless it has made gratifying progress in the dissemination of information concerning our aims and methods, by means of public lectures and addresses and by the circulation of literature.

The active work of the Society began with an illustrated lecture by Dr. N. L. Britton in the United States National Museum on May 22, the topic being "Some Wild Flowers in Need of Preservation." Many colored lantern slides were exhibited, and the impression made on the large audience by Dr. Britton's arguments was evidenced by the extensive membership enrollment. As this report goes to press, arrangements are being made for a lecture on "Vanishing Wild Flowers," by Mr. Charles L. Pollard, the Secretary of the Society, at Johns Hopkins University in Baltimore, and at the Academy of Sciences in Philadelphia. A public meeting was held in Pittsburg July 3, in connection with the sessions of the American Association for the Advancement of Science, addresses being made by Professor Charles E. Bessey, Professor S. M. Tracy, Mrs. N. L. Britton and others. Full reports of these affairs have appeared from time to time in THE PLANT WORLD.

There has been an extensive distribution of printed matter. The prize essays of Dr. Knowlton and Dr. Grout on "Wild Flower Preservation," reprinted from the *Journal of the New York Botanical Garden,* have been sent out to all applicants, and frequently in large packages for local distribution. The same has been done with Mrs. Britton's paper on "How the Wild Flowers are Protected," which has been of especial value among the schools. Reprints of the Constitution of the Society, and directions for forming local chapters, are sent wherever they may be needed. Eight thousand copies of the general circular of information have been used.

The Board of Managers has held two meetings during the summer. The most important business transacted has been as follows: (1) The appointment of an Executive Committee, consisting of all members of the Board resident in Washington, to which has been intrusted the administration of all matters of detail other than the appropriation of money or the decision of questions of general policy; (2) the election of Miss Caroline Phelps-Stokes and Miss Olivia Phelps-Stokes, of New York City, as Honorary Vice-Presidents; (3) a business arrangement with THE PLANT WORLD whereby the journal is furnished free to members; (4) the establishment of a life membership fund, made up of the fees received from Patrons and Fellows; (5) the settlement of routine matters, such as the authorization of the payment of bills for postage, printing, etc.

The Society is still young, and has scarcely been able as yet to do more than insert the entering wedge of its influence on public opinion. The experience of the Audubon Societies and of the American Forestry Association, however, show what good results may be expected from earnest effort. To carry out the various lines of activity planned for the coming season we are in urgent need of funds and volunteer workers. Every one of our active members should constitute himself a committee to secure additional enrollments. It is possible to bring a movement actively before the Society only by the expenditure of sufficient sums of money for printing and other purposes. There is also a necessity for some clerical assistance, as the officers of the Society contribute their services, and many of them are already burdened with professional and other duties.

The Secretary states that the rolls at present contain the names of 7 Fellows and 167 members. The financial reports of the Secretary and of the Treasurer, which were audited too late for insertion at this time, will be printed in the next issue of THE PLANT WORLD.

Respectfully submitted on behalf of the Board,

FREDERICK V. COVILLE, *President.*

GENERAL ITEMS.

THE enthusiasm of North Carolinians for the Appalachian Park can hardly be appreciated by people at a distance who do not know of the dangers that menace some of our most beautiful shrubs and trees. The spoon and ladle makers, the rustic furniture fiends, and now the pipe manufacturers, have wrought great havoc in our rhododendron and kalmia thickets. Many roots of the kalmia have huge knots or lumps, caused probably by some insect, just where the stems enter the soil. Often these roots are nearly a foot through. The pipe-makers are beginning to use them for the same purpose as briar roots, and for several seasons their agents have gone through the neighborhood buying up acres of "ivy," as the kalmia is frequently called here. The diggers are paid a dollar a day for their work, but there are plenty of small landholders who will sell the knots for only fifty cents a ton, so that there is more money in it for the digger than for the owner. The many hills shorn of their evergreen robe, so gloriously spangled in springtime, and left an unsightly jungle of dying bushes, dead branches and upturned earth, show the track of the ivy digger. But the unappreciative old farmer does not regard him as a vandal. Surveying the ruined hillside, he will chuckle, as he tells you: "Never expected to have somebody to pay me for the privilege of doin' that grubbin'. 'Spected to pay out hard dollars to get it done myself."—*L. Greenlee, in Country Life in America, Christmas Annual.*

WE are accustomed to think of all members of the Composites as herbs of a few feet in height. There are, however, many shrubs and one or two trees which boast of the blood of the biggest, if not the best, family. One of the most peculiar species is a succulent plant which appears in the "pedregal," or recent lava fields of Central America and Mexico; its thick, gray-barked trunk attains a height of 10 to 15 feet and has very few branches; the wood is soft, spongy, and always saturated with water.

And hidden away in the jungles of the Malay Peninsula there is a fleabane which, according to Mr. H. N. Ridley, of the Singapore Botanic Gardens, attains a height of 70 feet. This remarkable tree (*Vernonia arborea* Ham.) produces a light, yellowish or brownish timber, of fair value. Being local, rare, and at home in that rapidly changing corner of the world, the tallest Composite is likely to become extinct within a short time.—*O. W. Barrett.*

PAN IN VERMONT.

Extracts from the poem of Rudyard Kipling in Country Life in America, Christmas Annual. Copyright, 1902, by Rudyard Kipling.

It's forty in the shade to-day, the spouting eaves declare;
The boulders nose above the drift, the southern slopes are bare;
Hub-deep in slush Apollo's car swings north along the Zod-
-iac. Good lack, the Spring is back, and Pan is on the road!

(What though his phlox and hollyhocks are half a month demised?
What though his ampelopsis clambered *not* as advertised?
Though every seed was guaranteed and every standard true—
Forget, forgive they did not live! Believe, and buy anew!)

Serene, assenting, unabashed, he takes the orders down:—
Blue Asphodel on all our paths, a few true bays for crown—
Uncankered bud, immortal flower, and leaves that never fall—
Apples of Gold, of Youth, of Health—and—Thank you, Pan, that's all.

NOTES OF CURRENT LITERATURE.

Two excellent local floras, received by us some weeks ago, have been forced to await the leisure of the editors for examination. One is a flora of the the town of Southington, Conn., consisting of the ferns and seed plants growing without cultivation in the town and its vicinity, prepared by Charles H. Bissell and Luman Andrews, and published by the State Board of Education. It is a well-arranged list, prefixed by a discussion of the geographic and physiographic features of the region, and supplemented by a large map. The text contains very exact statements of habitat, and is therefore useful to the ecologist for reference. The authors use the nomenclature of Gray's Manual.

A more elaborate work is the "Manual of the Flora of Jackson County, Missouri," by Kenneth K. Mackenzie, assisted by B. F. Bush and others. It is a cloth-bound volume, and contains descriptions of and keys to all the included genera and species. Twenty-two new species and varieties are here published for the first time, and the nomenclature is that of the Rochester code. Like the other book, this is prefaced by a description of the region under consideration; and there is a glossary of technical terms. The treatment of the species follows modern lines, and the work is to be commended not only to the students in Jackson County, but to botanists throughout the floral area with which it deals. C. L. P.

EDITORIAL.

THE receipt of the sixth report of the extension work carried on by Cornell University Agricultural Experiment Station, leads us to call particular attention to what we consider one of the most, if not the most, important steps toward the uplifting of agriculture and the promotion of science that has ever been taken. This work not only includes reading courses especially prepared for farmers and their wives, but also nature study work along three lines as follows: The formation of Junior Naturalist Clubs, Lectures on Nature-Study Topics and the Home Nature Study Course. The immense value of this work as bearing upon the development of agriculture and the rural population of the State can scarcely be conceived. The children who come under the influence of this movement cannot fail to become better farmers and better citizens than they otherwise would. An enthusiasm for nature and habits of careful observation fixed in youth develops a permanent power for happiness and good throughout life. Persons having the benefit of this training will appreciate the importance and value of pure scientific research, and hence botanical and other lines of investigation will receive the intelligent encouragement and support which they deserve. Other States would do well to follow the example of New York, and introduce similar methods of reaching and improving the rising generation as well as the present.

WE regret very much to announce that, owing to illness, Mr. W. E. Safford has been unable to prepare the current installment of his "Notebook of a Naturalist in the Island of Guana." We trust he may be sufficiently recovered to continue this interesting series in the first number of the new volume.

THE prize in our cover design contest has been awarded to Mr. J. Marion Shull, of New York City, and our readers will have an opportunity of passing judgment on the successful design in January. The judges in the contest were Mr. W. E. Safford, Mr. David White and the editors of THE PLANT WORLD.

FRANK HALL KNOWLTON.

THE PLANT WORLD

A MONTHLY JOURNAL OF POPULAR BOTANY

OFFICIAL ORGAN OF THE WILD FLOWER PRESERVATION SOCIETY OF AMERICA.

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ORIGIN OF PLANT NAMES.

By Grace Niles.

IV. THE CROWFOOTS, BELL-FLOWER AND OTHER PLANTS.

(concluded from november issue.)

THE bugbane *(Cimicifuga racemosa)*, a member of the Crowfoot family, derives its generic name from its supposed efficacy against insect pests, *cimex* signifying a bug, and *fugo* to drive away. Ranunculus, the scientific name of the buttercup, originated with Pliny, and means literally "a little frog," and hence a frog's foot, referring to the shape of the leaves. It was thus used originally as a designation for the aquatic species alone. The larkspur, a genus related to the columbine, was known in Greek as *Delphinium*, and in Latin *Consolida*, so that Linnaeus perpetuated both names in the binomial *Delphinium Consolida*, dedicated to Delphin, a figure in classical literature, this coming in turn from dolphin, a kind of fish or the white whale. The field larkspurs of this country introduced from Europe belong largely to this species.

Of the "larke's spurres" Dodoens wrote, "Their leaves be all jagged and fringed like southernwood, while one of the leaves of the floure is long and hollow, and behind it is a crooked spurred tayle, of a very blew colour like unto violets, and kings confound it as Wild's Larke's-spurre, or Larke's-claw." It is said to have been used against the sting of the scorpion with instantaneous effect. "If the herbe be thrown over this venomous reptile he becomes powerless and unable to move or sting."

A preparation from one of the European species of *Delphinium*, known as stavesacre, contains no less than four alkaloids, one of which is closely allied to aconite in properties; this is also used by druggists as a parasiticide under the name delphine.

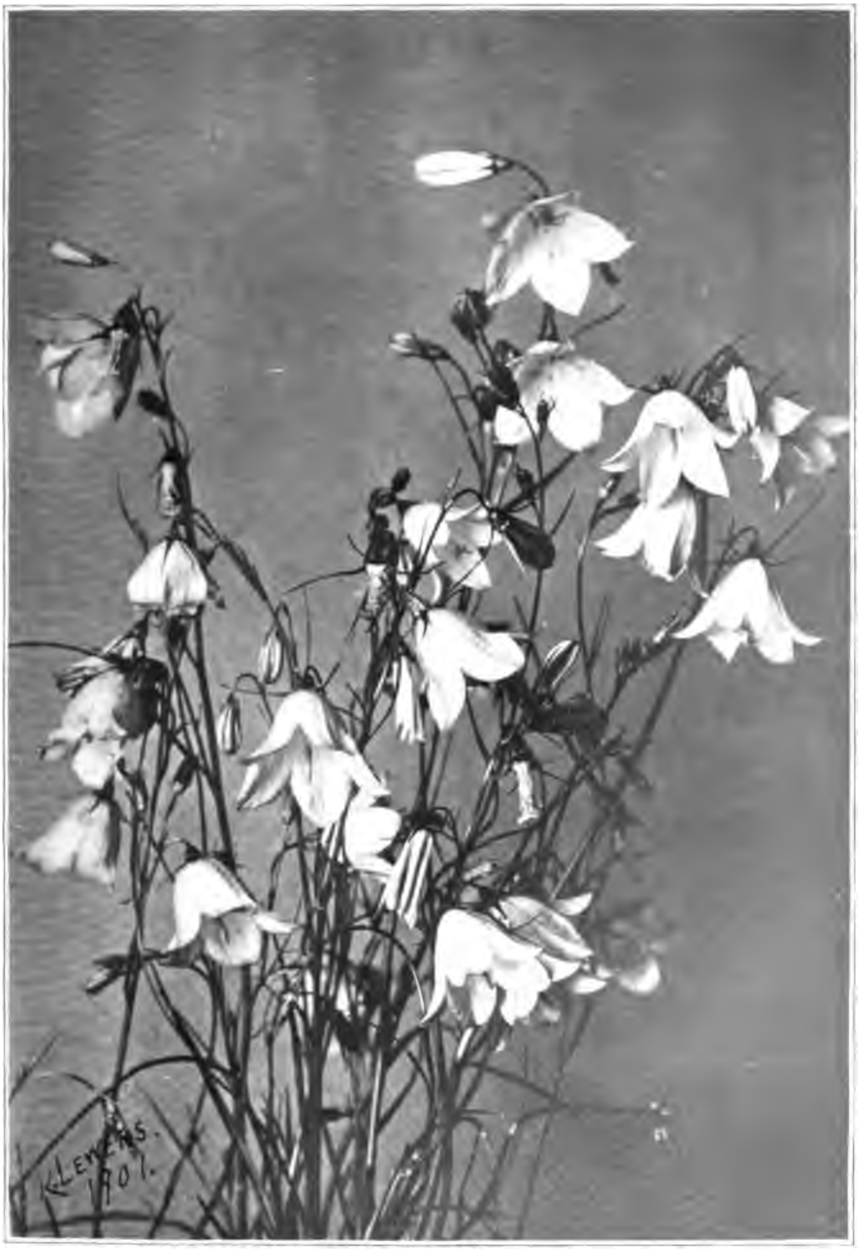
The name honeysuckle is frequently applied to the columbine, and it was also known as woodbine. Dodoens, writing of the woodbine, designates it as "honisuckle," and remarks, "At the end of the branches of Woodbine grow floures in tuft like nosegaies, of a pleasant colour and sweet savour, betwixt white and yellow or pale purple, long and hollow, almost like the little bags of Columbine." It is thus probable that the true honeysuckles became confused with the columbines by country folk, since both produce the little bags of honey.

The persistence of misapplied names is often remarkable. Thus, *Caltha palustris* is universally known as cowslips or marsh marigold, although the original marsh marigold is the celandine. Of the seed capsule of the latter, it was said, "When the floure being gone, or fallen, we shall see three or foure small husks, like to the husks of columbine, wherein is contained small yellow seeds." The name celandine was applied to these flowers, because they appeared in spring at the coming of the swallow.

The true cowslip is the English primrose or St. Petie Mullens, known in Latin as Herba St. Petri. The American cowslip received its generic name, *Caltha*, from the fancied resemblance of the golden flower-cup to a goblet. Cows and horses are known to feed upon the herbage of Caltha. The cowslips of the ancients, or the celandines, were confused with the figworts. I think that we are accordingly justified in retaining the popular name American cowslip or horseslip for our species of Caltha.

The water dragons of the Arum family were also held in great reverence by the ancients as herbs powerful against the bites of serpents, and bore Latin names, such as Serpentaria and Calabrinus, in English, dragonworts. "It was thought of some, that if cheese be laid amongst dragon leaves, it would preserve the same from perishing. Dioscorides writeth that it is thought of some that those which currie about the leaves or roots of Great Dragonworts, cannot be hurt nor stong of vipers and serpents."

The study of the names of species of *Orchis*, *Iris* and *Lilium* would in itself constitute a volume, if carried out in detail. The English *Orchis Morio*, known commonly as satyrion royal, and noble satyrion by the ancient Grecians, became in Latin *Testiculus Morionis*. and was



The Hairbell (*Campanula rotundifolia*).

later known in English as royal stander-grass, dead men's fingers, dead men's thumbs, and long purples, the last mentioned by Shakespeare in Hamlet, as being woven into Ophelia's garland:

> "There with fantastic garlands did she come
> Of crow-flowers, nettles, daisies and long-purples."

In "Robinson's Garden," Rev. Mr. Ellacomb alludes to these species of orchids as dead men's thumbs. "The rootes of these floures," writes Dodoens and Lyte, "are like a pair of hands, each parted into four or five small rootes like fingers."

Feé identified the Satyrion of the ancients with *Orchis Morio* of Linnaeus, and this species is closely allied with our American purple-fringed orchids, such as *Habenaria grandiflora*, and more especially *Habenaria psycodes*, the smaller flowered species.

The classification of plants by Dodoens seems to have been on the hit and miss order. His orchids are placed in juxtaposition with saffron, hyssop, thyme and garden savory, as well as species of lilies. He also associates the roses and violets; yet in several groups he recognized natural affinity and designated the species by binomial names, giving also all the appellations used by writers before him.

The most ancient literature relating to plant names is not found outside of the larger botanical libraries in our great cities; and even here it is seldom that English translations are to be found. Here is, indeed, a field for the philanthropist to endow the various State colleges with a fund for the translation and reprinting of rare and valuable works, so that they may be accessible to all nature students. Henry Lyte gave as his reason for translating Dodoens' work, "Bonum quo commune, eo melius et praestantius," that is to say, the more common a good thing is, the better.

Much is written on the origin of blue-bells, Canterbury and Coventry-bells, the latter being named from the two churches whose bells the flowers were supposed to resemble in shape. The harebells of New England are closely allied to the bluebells of old England. Dodoens says, "The floures grow at the top of the stalks of a faire purple colour, fashioned like a bell or cymball, with a small white clapper in the middle; they open after sunne-rising and close toward sunne-set, and when they be closed, they have five plaits, like to the Coventry Marianus Violets."

The love of the marvelous prevailing in the early periods of civilization probably proved a barrier against the rapid progress of the study of botany. Evidences of the influences of this age may be found in such works as "The Art of Divinations," "Prognostics from the Changes in the Moon" and the "Interpretation of Dreams," all of which are filled with what seem absurdities to the modern intelligence. Even civilization and Christianity have not quite outgrown superstition, however. It has been justly written by Dr. Stewart, that the cultivation of ornamental plants is one of the distinguishing marks of civilization. Search the whole world over and you will not find among the lower orders of people a single flower, shrub or tree cultivated for ornament or even for shade.

SAN JACINTO MOUNTAIN.

By S. B. Parish.

IN the catalogue of American mountains, San Jacinto is not a familiar name; yet its peculiar situation invests it with certain biological features of unique interest. It is, as one traces the course of the Sierra Nevada, the last of its high peaks. Not attaining to the first rank, for it is but 10,805 feet high, it presents, on its northern aspect, the appearance of a more commanding altitude. Here the wide, low San Gorgonio Pass separates it from the opposite and higher San Beranrdino and Grayback mountains. From this base it towers aloft in rugged and forbidding precipices, as though rent off by some tremendous catastrophy.

Eastward the parched Colorado Desert lies shimmering through the tremulous heat-waves. The fierce winds, as they sweep upward to the pass, heap drifts of sand behind the ledges of rocks which jut out from the mountain's base. The vegetation, answering the demands of its environment, is of plants fitted to endure heat and drought. Over the slopes are scattered cactuses and agaves; trees, green-barked and almost leafless, mark the courses of the dry torrential washes. Where in the frostless cañons a feeble stream trickles through the sands, palms lift their crowns.

The altitude of the desert which supports this Lower Sonoran flora is, at this point, about 500 feet above sea level, and the perpedicular distance to the summit of the mountain is, therefore, some 10,300 feet. So steep is the acclivity that its slope seems no more than a third longer. In that short interval one passes from the vegetation of the Mexican Plateau to that of the circumpolar region. Instead of palms the gorges of the summit shelter long-enduring—perhaps perpetual—snows, about whose edges flourishes a true, though scanty, Arctic flora. Nowhere else are characteristic plants of the Arctic and Sonoran zones separated by so short an interval. Were it possible to clamber down the steep descent, one might in an hour pass from beside plants whose leaves must be nightly stiffened by frost, to those which never feel its touch.

This summit is, moreover, the point furthest south where alpine plants have been found in North America. Thus far at least, then, extended the refrigerating influence of the glacial period in the geological past. If it reached beyond, no mountains sufficiently high have preserved a record to our days, in plants left stranded, as the ice-cap retreated northward.

These northern and eastern faces of San Jacinto are too steep, rocky and arid, too much exposed to the heat and glare of the desert, to support other than the scanty shrubs and herbs that can cling in the crevices. Their zonal distribution is, at least, obscure. But on the opposite side the case is different. There the mountain falls by easier descents and sends out subsidiary ranges whose corrugated folds separate it from the Pacific. Coniferous forests clothe its slopes, enfolding meadows, with brooks and tiny lakelets. Here are conditions to encourage diversity of growths, and room for plant stratification to manifest itself. Mr. H. M. Hall has carefully studied this interesting flora, and in a recent paper* has traced out its disposition, and the causes which determine it.

In descending the mountain upon this side, one passes from the Arctic, successively through the Hudsonian, the Canadian and the Transectional life zones, to the Upper Sonoran; or, to take the pines as an index, leaves behind in turn the lumber-turg, the lodge-pole and the yellow pine *(Pinus flexilis, P. Murrayana* and *P. ponderosa),* before reaching the great chaparral belt of the foothills.

As in all these southern mountains, the various zones are somewhat confused. In places they commingle, or they run promontories into one another's territory, or intrude as "islands." The familiar causes of such interpenetration are here supplemented by influences arising from the proximity of the desert, influences by which the disposition of the flora of the whole region bordering upon it are affected. It presents, therefore, a complicated problem, much more difficult than that on the desert side, where all the intermediate factors are practically eliminated.

One of the most important services rendered by the plant-breeding experts is to secure disease resistant, or immune, plants as the most practical way to fight plant diseases. Striking success is reported in this line. The development of cotton resistant to wilt diseaae is now an assured fact, and a variety of cowpea has been discovered resistant to wilt and to root knot.

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* A Botanical Survey of San Jacinto Mountain. By Harvey Monroe Hall, Univ of Cal. Public. Bot. 1, pp. 1-140. June, 1902.

THE PRESERVATION OF OUR WILD FLOWERS, SHRUBS AND TREES.

By Jessie Wallace.

BEFORE making any suggestions for the preservation of our native plants it would be well to note carefully what are the destructive forces; to diagnose the case before prescribing the remedies. My knowledge of this subject is matter of personal experience, and to recite the tale of an attempt along these lines may elucidate the matter.

We have thirteen acres in Northern Westchester, near Hudson, just outside a town limits. Nearly in the centre of our domain is a half acre of primitive wood, containing numerous specimens of finest native trees, and in spring carpeted with wild flowers. In spring time, especially on beautiful Sundays, the young people and children wandering up the valley from the town would denude our woods of flowers were it not for our vigilance. As a rule the small girls and boys are most destructive in their manner of picking.

One day a little fellow came to me, with a "please, ma'am, may I pick a few flowers out of your woods." Giving the desired permission it was rather amazing later to see what a few flowers had meant. Great bunches of the blood-root filled his hands and it is doubtful if he had left any in sight. Since then the small boy has not enjoyed the freedom of our woods. This boy, like many others of whom he is but an example, could turn a few pennies by the sale of these flowers; others seem simply to enjoy the gathering of the beautiful things and drop them in a few moments for fresh ones. The older people may occasionally pick in quantities, but according to my observation less seldom than children and lads.

In order to prevent the destruction of these flowers there are doubtless some measures which will check, if not wholly stop, their ruthless picking.

There is a law forbidding trespass which can be enforced, if necessary, but within my acquaintance have come very few farmers who have sufficient love for the beautiful to see that people are kept off their lands who wander over them merely, as they consider, for harmless purposes. It would be possible, however, in my opinion, to arouse their interest in this direction through the Granges, and that of the children through the schools. Let the society interested in this work publish pamphlets giving short descriptions of the wild flowers in danger of extermination, how they increase, and the benefit their beauty brings to mankind, and let this matter be distributed to the schools which will use it. If the attention of the children is brought to the matter and their interest aroused they are much more likely to be careful than if they were wholly ignorant of the matter.

In June, for Children's Day, and at Christmas time, we appeal to the children for help in gathering flowers and greens for the decorations at our Sunday-school festivals. To those who are not acquainted with rural child nature, it would be a pleasure to see how they respond, and how the interest of the elders is enlisted to obtain the desired decorations. A poem, or little essay on these occasions, would bring to the children's attention a way in which they could be helpful by care of all these natural beauties, and teach them a reverence for the works of God in nature.

Where it comes to the preservation of our trees and shrubs, we have reached a problem which can only be solved by legislative enactment. But back of every law must be public sentiment, and a knowledge of the evils which the law is intended to correct. There is a proportion of the rural population who appreciate the tree for itself, and because of the beauty it adds to the landscape, but the larger number look at the trees from a purely utilitarian standpoint.

An instance comes to my mind of one of the best and largest farms in our region, where no fine tree shades the house, and never a bit of shade refreshes the passer-by along that dusty stretch of road. The owner is but a type of the class of men to be found in all the country round, who can never be reached by sentiment, and would cut down road-side trees or primeval forest without compunction.

But how sorely we need to arouse both public sentiment and bring to bear the forces of law can be best illustrated by giving an instance of wanton destruction of a glorious bit of forest, with its shrubs and flowers, which lies on our road within the town limits. It is on a very steep hillside, and after the wood was cut, most of the land was practically valueless. Lying along the road, a most refreshing shade was given where it was much needed; and the immense trees delighted by their beauty of form and size. A judicious cutting of that forest would have brought no protest; but it was aggravating, to say the least, to find that after the lumbermen had left, there was not even a single tree along the roadside to furnish the shade and relieve the bareness and ugliness of the spot. If left to itself, in a few years there may be a scraggly second growth; but at present unsightly weeds and stumps remind us of what many considered one of the chief beauties of our somewhat commonplace road.

Much has been done by lectures and articles in papers and magazines, to bring to the attention of the public the need of preserving our natural beauties. This campaign of education must continue, and again, I would say that the children in the schools may be taught, through especially prepared Readers, some of the simple facts in regard to the forests over which many of them may have control. They can learn to know how much pleasanter the roadsides are when shaded, and few will fail to comprehend that there is need of forests about the sources of brooks and rivers to keep them from drying. Arbor Day does somewhat in this line, but hardly enough to make a serious impression. Short compositions by the children on wild flowers, shrubs and the trees, especially if some little prize were awarded for the best, would awaken interest. It is my full belief, however, that carefully framed laws will be the only real check upon this continually growing carelessness in regard to our natural resources.

No amount of sentiment could save the birds; their destruction was checked only by statute.

If the farmers or land-owners need the money, no consideration for the beauty or the good of the country will stop them from cutting their trees and shrubs, be they on highway or along water courses. From my own personal observations could be drawn numberless illustrations to show the truth of this statement.

Already much has been done by the Forest Commission, but chiefly in those lands which belong to the State. They have been empowered to disseminate literature; but it has probably gone to the higher schools; and the fact may have been overlooked that the large mass of the farming population has only a common school education. Their reports and warnings are useful documents, but no matter of theirs which would interest the untrained mind, has come to my hand.

Why should there not be one law on our statute books regarding a matter of such general interest and need, which should be applicable over the entire State?

It seems to me that a large majority of the population would be pleased to see better care and protection given to the trees upon our highways and village streets.

The road commissioners could be empowered to guard the trees which border and shade the public ways; to forbid the cutting down of such trees except where they are old, unsightly or decayed; to compel the replacing of such as were cut by young and healthy saplings, and last, but not least, to preserve worthy specimens of the forests when the land bordering on the roads is cleared. In the choice of the latter consultation with an expert forester connected with the State Commission would be of great benefit.

Is there anything chimerical in these suggestions? Few of us will ever enjoy the beauties of the Adirondack forest or the Kaatskill preserve; but we shall not regret so strongly the passing of the forest if only a strip shall be left us along the road to show us its original beauty.

The connection between forest and delicate wild flower is so close that the safe-guarding of one means the protection of the other.

It certainty would not overburden the Commissioners to watch the forests in the sections which they are supposed to know thoroughly, and make regular reports to the State Board, thus giving information that the experts could act upon.

When some such idea as this shall have spread beyond the commission's reports and into the actual working life of the community, we may have gotten one step nearer to that time when the needs of the body politic have overcome the selfishness of its individual members.

PEEKSKILL, N. Y.

WHERE LICHENS GROW.*

BY THOMAS A. WILLIAMS.

NOT long since, while the writer was collecting lichens in the woods near Washington, he was accosted by one of a number of boys who were fishing near by with "Say, Mister, what are you getting off of them rocks?" This question answered, the next was, "They ain't alive, are they?" and then, "What do they live on?" As the explanation proceeded, other of the lads gathered about and soon, instead of one, there were a half dozen enthusiasts engaged in the collection and study of lichens. It was remarkable how soon the boys learned to distinguish between the common species growing on the earth, rocks and trees, and their eager questions showed that, like Lurella, in "The Village Schoolmaster," they "wanted to know."

Soon the discussion turned to the subject of the usual habitats of such plants; each lad could tell of some peculiar or out-of-the-way place in which he had seen some particularly nice examples of these lovely plants, during some of his rambles in the woods. The gray, green, yellow and brown patches of lichens on rock or tree had arrested his attention, and he had "wondered what it was." And so on for an hour or more.

When the boys finally left, talking among themselves about the curious plants they had been gathering, and carrying with them a good illustration of the fact that the commonest things about us are often the most wonderful and interesting, one could not help a feeling of indignation at those teachers (and their number is, unfortunately, not small) who take these bright boys, and girls too, and after years of instruction

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*EDITORIAL NOTE.—In response to several requests we are reprinting from Vol. V. No. 5, of *The Asa Gray Bulletin*, this article by the late Professor Williams. The original closed with an invitation to students to submit material to the author for naming; and up to the time of his death he had received many specimens from readers of this article, which was the first of a series on the subject.

give them back to us with eyes that see nothing of nature's beauty, ears that can not hear the great Voice speaking through all her phenomena, and powers of observation and perception dulled to the many beautiful and grand things in this great nature which surrounds us on every side, and of which we are a part—in fact, educated away from much, perhaps all, that is brightest and best in life. Let us all bid the "Nature Study" movement "Godspeed," and do everything we can to help it along.

But where do lichens grow? It would be easier to say where they do not grow. From the lowest of lowlands to the snow-capped top of the highest mountain, from the moist spray-washed stone to the dry sterile sand of the desert, from the moist bark of the forest giant to the dry, dead branches of the sagebrush and greasewood, the quiet, unassuming lichen grows, defying in a truly wonderful manner the extremes of temperature, drouth and moisture.

Of course, lichens have a choice as to places of growth, and a little observation will soon tell us where to look for certain kinds. Thus Cladonias, as a rule, grow on the earth or rotten wood, in forests on moist situations, in the mountains; the Peltigeras may be sought in similar locations; the Umbilicarias, Omphalarias and many Endocarpons prefer rocks and clifls; the Pyrenulas are found on trees with rather smooth bark, while the closely related Verrucarias grow only on the rocks, usually where they are kept continually moistened by spraying or dripping water. Certain species of Biatora are found only on moist rocks, near water; others only on the dry rocks of the arid desert. The peculiar structure of the lichen plant enables it to undergo great extremes of climatic conditions, hence the very wide and general distribution of these plants over the world.

While the lichens, as a group, are so widely disseminated, many of the species are very local in their occurrence, owing to the development of peculiar habits of growth. Thus certain species are seldom found on any other substratum than granite, others prefer limestone, or perhaps sandstone, the bark of oak trees, or dead wood, fence rails, etc.

Under certain circumstances specimens may be found having very peculiar habitats, as, for example, old iron, cloth, bones, and the like The present season the writer found fine specimens of several species of lichens on the bones of buffalo, mountain sheep, bear, etc., in the Rocky Mountains, and elsewhere in the West. The skull of a buffalo was found literally covered with species of Placodium, Lecidea, and Physcia, a single jaw tooth bearing as many as five distinct species. In another instance, a bear's jawbone furnished a beautiful specimen, and the antlers of deer and elk, and horns of mountain sheep, were frequently observed covered with patches of gray, yellow, brown or black, by the different lichens growing on them.

Although a greater variety of species is usually to be found in moist or protected situations, the bleak, exposed places should not be passed by, for many of the most interesting forms occur there. One can hardly go out for a walk anywhere without finding a place where lichens flourish. Some years since, while the writer was walking along the street in Cambridge, Mass., a chance exomination of an elm tree growing by the walk revealed a very rare Rinodina, in great quantity. The species had been reported but once or twice since its original description by the lamented Professor Tuckerman.

FOSSIL MOSSES.

BY F. H. KNOWLTON.

I HAVE been requested to prepare an article on the subject of fossil mosses, and I take this occasion to present the following somewhat hasty summary of the present state of our knowledge of the geological history of this interesting group of plants. It goes without saying that the great majority of living mosses are of such small size and relatively simple cellular structure, that only exceptional conditions could result in their becoming fossilized, and inasmuch as the group has always, so far as we know, occupied an eqally humble position in the plant world, the further back we go in geologic time the greater become the difficulties, and less and less likely the probability of their being recognizedly preserved. In the absence of the characteristic moss "fruit" or sporostegium, it is almost impossible to recognize fossil moss-plant fragments. Yet it is not at all improbable that the group was of early introduction and has been lost or obscured in the vicissitudes of rock deposition and transformation. Limpricht has expressed the opinion that mosses played an exceedingly important role in past time, and, while we have no very direct proof of this, it is not, perhaps, impossible.

A number of forms have been described from the Coal-Measures, that present very much the appearance of mosses, but they are without "fruit" and must be held to be more or less questionable. On the other hand there are Palaeozoic specimens that have been described as twigs of Lycopodites, Selaginites or Lepidodendron, that may have been portions of mosses, and there are certain supposed conifers with small and crowded scale leaves that are not unlike some of the stouter forms of moss stems. Solms-Laubach has suggested that some of the small twigs described by Lesquereux as *Lycopodites Meeki*, from our Coal-Measures, may possibly belong to a moss, but Seward inclines to doubt this, and the matter must remain in question. One thing is certain, if mosses were present in the Carboniferous age they were not abundant, and could hardly have played a very important part.

The arguments for the presence of mosses during Mesozoic time are hardly stronger than for their Palaeozoic origin. Many years ago Professor Heer, a celebrated student of fossil plants, predicated the presence of mosses in the Jurassic (Liassic) from the occurrence of fossil caterpillars in these beds, these insects being of a type known to feed on mosses, but this can hardly be accepted as scientifically sound. So far as now known not a single species of fossil moss has been found in rocks of Mesozoic age in North America.

But when we come to the Tertiary age the matter, as might be expected, assumes a more hopeful phase. The earliest extinct species recorded for America was described by Mrs. E. G. Britton, in 1899, from the upper Eocene at Cle Elum, Washington, under the name of *Rhynchostegium Knowltoni.* It is a small sterile stem about 1 cm. in length and bears rather scattered two-ranked leaves. Mrs. Britton regards it as being related to the living *R. rusciforme.* The only other supposed extinct American species was described by Lesquereux as *Hypnum Haydeni,* from the Eocene of Colorado, but it seems more than likely that this should be referred to Lycopodium. In addition to these, fragments of several living species have been found in the Pleistocene deposits of Canada, and this completes the list of our fossil mosses.

In other parts of the world conditions during Tertiary times were more favorable for preserving mosses, and some thirty more or less satisfactory species have been described. The Baltic amber, which is so widely celebrated for its inclusions of often beautifully preserved insects and various plant fragments, has supplied several species of mosses. These represent living genera, and other European deposits of recent geological age have afforded a number that have been referred, either definitely or provisionally, to living species. So far as I know the only fossil moss that has been found with the capsules preserved is from the Tertiary deposits of Montabauer. This was called *Gymnostomum ferrugineum* but has since been referred to Sphagnum, and is supposed to be related to the living *S. cymbifolinm.*

From this hasty review it appears beyond question that our knowledge of fossil mosses is extremely limited, and since the study of fossil plants has been so widely prosecuted in different parts of the world without disclosing many of their remains, it is hardly to be expected that our information will ever be very extensive. Yet it should not be forgotten that this is only negative evidence, and perhaps "to-morrow" some fortunate collector may happen upon a deposit that will show an abundance of these plants.

BRIEFER ARTICLES.

COCOANUTS IN CUBA.

To those who are accustomed to think of the cocoanut as an article used chiefly by confectioners and bakers, it is something of a surprise to learn, through a visit to one of the centers of distribution in the West Indies, the real magnitude of the industry. Cocoanuts are exported to the United States in great numbers from Porto Rico, Cuba, and Central and South America. In Cuba the great bulk of the trade centers in the little town of Baracoa, near Cape Maisi, at the eastern extremity of the island. Here, along the coast, the tree attains a degree of productiveness unequalled elsewhere, and although growers around Baracoa have been disturbed of late by a disease which is affecting some of the trees, the monthly output is still about 1,500,000 nuts.

The cocoanut palm may be depended upon to give a crop at all seasons. As the leaves are put forth, new clusters of flowers appear each month in the year, and the fruit develops with surprising rapidity, so that a tree carries many nuts of different degrees of size and advancement. No attempt is made to gather the nuts until they fall, after ripening naturally; they are then gathered up, divested of their husks, and carried by pack mules to the nearest center of distribution. The contractors receive them either in bulk or at separate prices for the selected nuts, and they are then loaded on steamers and schooners for transportation to the States. The meat of these nuts is prepared and shredded, and finally reappears in various delicacies on our tables. But this is by no means the only important side of the industry. All bad or defective cocoanuts are disposed of to factories which manufacture cocoanut oil from them, and the oil is further used for making soap. There is thus a sure and safe investment in cocoanut growing for the individual who desires the most returns from the least expenditure of money and energy.

While the nut is green it contains a very thin layer of meat and a large quantity of colorless liquid, known as the "milk." This is always refreshing to the thirsty traveler in the tropics, and if he is provided, as he should be, with the ever needful machete, he soon learns to slice the nut open in such a way as to enable him to drink comfortably through the aperture. As the nut ripens the quantity of liquid lessens, and it constantly changes in quality and flavor, so that all tastes may be suited. Personally, I prefer the milk of a cocoanut that is nearly or quite ripe.

As an ornamental tree *Cocos nucifera* is almost without a peer among the palms. The restful effect of scenery in which a number of the long waving plumes appear, set in relief against the ultramarine of a Cuban sky and sea, is something to be imagined rather than described.

WASHINGTON, D. C. CHARLES L. POLLARD.

FLORAL EMBLEMS.

Several States have chosen a State flower, and just now the school children of West Virginia are in the midst of a campaign preliminary to a vote which will determine the floral emblem of that State. Laurel, which flourishes in mountain regions, appears to be a favorite in the contest. Might it not be a diversion were a floral emblem chosen for the District of Columbia? The States and the flowers adopted by them as typical are: California, the poppy; Louisiana and Mississippi, the magnolia; Colorado, the columbine; Maine, the pine cone; Kansas, the sunflower; New York, the rose; Rhode Island, the violet; Iowa and North Dakota, the wild rose; Vermont, the red clover; Delaware, the peach blossom; Utah, the sego lily; Idaho, the syringa; Arkansas and Michigan, the apple blossom; Oklahoma, the mistletoe; Oregon, the Oregon grape; Washington, the rhododendron; and Minnesota, the lady slipper. Several States are discussing the matter of the adoption of a State flower, and it is thought likely that Florida will choose the orange blossom, New Mexico the cactus, Kentucky the blue grass, and South Carolina the palmetto, though there is much more palmetto in Florida than in the "Palmetto State."

If a flower for the District were to be chosen it might be one of many. The old gardens of the District bloom with lilac, snowball, spirea, jonquil, rose and myrtle. The fields in summer and autumn are yellow with golden rod, while wild roses, violets, arbutus and laurel may be found through all the woods. Within late years a brilliant and dashing flower which has gained great publicity and distinction in the city is the red canna. Last summer it flamed in all the public reservations, and its blaze of color was seen in a great number of private gardens.—*The Washington Star.*

A TREE THAT OWNS ITSELF.

A giant oak tree which owns itself and eight feet of ground on all sides is one of the unique attractions at Athens, Ga., says the *Washington Times.*

The tree stands on Dearing street, in fashionaple Cobham, and is one of the most magnificent oaks in all the South. It is tall and symmetrical; its great limbs are shaped as if by the hands of an artist, and under its shade several generations have sheltered themselves from the heat or have taken refuge in storm.

Nearly a century ago Col. W. H. Jackson, son of Gov. James Jackson and father of Chief Justice Jackson, of the Georgia Supreme Court, went to the court house in this city and placed a deed on record, in which he said:

"For and in consideration of the deep love and veneration I have for the oak tree (giving location) and a great desire that the said tree be protected for all time, I convey the said oak tree entire possession of itself, together with eight feet of ground on all sides."

Col. Jackson loved the tree. He had watched its growth from its childhood, and when he saw it standing in its magnificent proportions it pained him to think that after his death it might fall into the hands of those who would destroy it.

The land around the tree has been sold several times, fashionable and costly homes have been built close to the tree, but the wishes of Col. Jackson as expressed in the deed have been sacredly carried out.

This is perhaps the only tree in the world which holds a deed to itself.—*American Gardening.*

THE WILD FLOWER PRESERVATION SOCIETY.

Below will be found the reports of the Secretary and of the Treasurer of the Society for the period from the date of organization, April 23, to November 1, 1902. It should be noted that the balance of $148.93 from the Secretary's statement is included in the receipts of the Treasurer's office, and is not separately itemized. The actual balance in the treasury, accordingly, on November 1, was $83.79. It has been necessary to make temporary drafts upon the life membership fund in order to pay the large preliminary printing bills, but during the coming season repayment will be made from the current funds.

Report of the Secretary for the year ending Nov. 1, 1902:

RECEIPTS.

To membership dues	$100 00	
To fellowship fees	125 00	
		$225.00

DISBURSEMENTS.

By payment to the Plant World Company	$73 54	
By expressage.	75	
By postage	1 78	
		76 07
By balance turned over to Treasurer		$148 93
		$225 00

Respectfully submitted,

CHARLES LOUIS POLLARD, Secretary.

I certify that the above accounts were correctly cast and properly vouched for.

F. H. KNOWLTON,
Auditor for the Board.

Report ol the Treasurer for the year ending November 1, 1902:

RECEIPTS.

To membership dues	$124 00	
To five fellowships	125 00	
		$249 00

EXPENDITURES.

By the Plant World Co.	$92 38	
By postage and stationery of officers.	7 83	
By printing of circulars, &c.	65 00	
By cash on hand	83 79	
		$249 00

CAROLYN W. HARRIS, Treasurer.

We certify that the above accounts were correctly cast and properly vouched for.

D. T. MACDOUGAL,
N. L. BRITTON,
ELIZABETH G. BRITTON,
Auditors for the Board.

GENERAL ITEMS.

A press report states that Dr. Julius O. Schlotterbeck, professor of botany in the University of Michigan, is about to make known officially the discovery of seven new distinct vegetable poisons. Experiments to test their properties are now being made on some of the lower animals. Three of these poisons are derived from the Allegheny vine *(Adlumia)*, a plant of the poppy family. This already yields protopine, and Professor Schlotterbeck has named the others adlumine and adlurnidine. From the celandine he has extracted the poisons which he has called stylophine and disphylline, and from the Japanese celandine the poison bacconidine, besides one as yet unnamed.

On November 6 a correspondent counted 26 species of plants in bloom at Bluemont, Va., at about 1,000 feet altitude. This is a remarkable number, even for the latitude of Virginia. The list of species was kindly furnished us, and will be retained for reference.

The practical utility of thorough scientific investigation of agricultural problems is nowhere better demonstrated than in the work of the Department of Agriculture in the broad field of physiology and pathology.

Pear blight has been especially severe lately in southern and Pacific coast States. A large field demonstration made last year in Texas resulted in saving four to five thousand bushels of fruit in the treated orchard. The "little peach" disease is rapidly spreading, and the department recommends immediate destruction of diseased trees. One of the worst diseases the apple grower has to contend with is bitter rot. Recent discoveries by the department will, the Secretary thinks, effect a thorough control of the disease, if they do not prevent it entirely. The study of the diseases of various trees has been taken up conjointly with the Bureau of Forestry. A careful study of various methods of preserving wood was also begun, and much valuable information obtained.

As we go to press the meetings of the American Association for the Advancement of Science and allied societies are being held in Washington, with an attendance of nearly 1500 scientists from all parts of the country. All indications point to a most successful meeting, although many of the programs are too crowded to afford much satisfaction. Botany is well represented through Section G, the Botanical Society of America, the Society of Plant Morphology, and the Botanical Club of the Association.

Professor L. M. Underwood, of Columbia University, will spend his sabbatical year in the West Indies continuing his Studies among tropical ferns. He goes first to Jamaica, thence to eastern Cuba, returning to Jamaica in the late spring.

EDITORIAL.

IT has recently been brought to our attention, that, within an interval of some four years, specimens cut from *a single tree* have been passed upon by experts in the genus to which this tree belongs, who have been able thus far to name *sixteen* species, all growing from the same root! We do not take exception to the abstract idea that all properly definable forms of plants should be named and described, but with such an example as this before us—and it is not an isolated instance—we can not rid ourselves of the suspicion that some of this "splitting" has been done hastily and on an insufficient basis of facts. It was to be expected that our earlier botanists, who were doing pioneer work, should have overlooked some forms abundantly entitled to recognition, but it is inconceivable that the proportion of such unrecognized species should stand as 1 to 20. At this rate it can not be long before each "species" will be a genuine type and each individual a "species."

THE Board of Trustees of the Carnegie Institution have made an appropriation of $8,000 for the establishment and maintenance of a desert botanical laboratory for the fiscal year 1902-1903, and the Executive Committee of the Institution have appointed Mr. Frederick V. Coville and Dr. D. T. MacDougal an advisory board in relation to this undertaking.

The proposed laboratory has been established for the purpose of making a thorough investigation of the physiological and morphological features of plants under the unusuul conditions to be found in desert regions, with particular reference to the relations of desert vegetation to water, light, temperature, and other special factors. A resident investigator to be placed in immediate charge of the laboratory will begin a series of researches upon certain more important problems outlined by the advisers, and facilities will be provided by the aid of which a few other investigators from any part of the world may carry on work upon any problem connected with desert plants.

This project, which it is to be hoped is only one of many in the direction of botanical investigations, is to be highly commended. The laboratory will be a center of research of unequalled facilities, and if an efficient director is appointed we may feel confident of the good results to be attained.

THE FACT that botanical nomenclature is probably to receive some attention during the Washington meeting of the American Association for the Advancement of Science brings once more before our minds the ever-vexing question of popular or vernacular plant names. We have discussed this subject at various times in these pages, but it has now been brought to our attention officially, as it were, through the formal reference to THE PLANT WORLD for consideration a letter addressed to the Chairman of the Nomenclature Committee of the Botanical Club. This letter discussed the diversity of usage among our common names for plants, and recommended that action be taken by some body of recognized standing to secure a uniform vernacular nomenclature.

It is certain that there would be a more general acquaintance with plants if they were provided with simple and easily memorized names, like those of the native birds and animals. Of course, the number of is infinitely greater; but it would not be necessary to carry the nomenclature beyond genera, of which ther are at present quantities with none but classical designations.

It has occurred to us that it might be well at an early date to begin the publication of lists of popular plant names, compiling them from all available sources of information, and treating one family at a time. These lists would undoubtedly elicit corrections and additions, and could ultimately be prepared for publication in book form, after they should become reasonably complete.

BOOK REVIEWS.

THE BOOK OF PEARS AND PLUMS. By Rev. E. Bartrum. John Lane: London and New York. 1902. $1.00.

The present volume forms number XI of the Handbooks of Gardening that are being issued by Lane, two of which were noticed in our pages a few weeks ago. They are uniform in size and topography, and the volume before us is fully up to the high standard of the others. Of course, it should be born in mind that the methods of culture necessary to insure success in pear growing in England are wholly different from conditions which prevail in this country, but there is much useful information that could be mastered to advantage by our horticulturists. It begins with a short but interesting history of the pear, then follows chapters on the soil, protection, planting, staking, etc., as well as full notes on the methods of producing the various types of trees, such as pyramids, columnar shapes, espaliers, horizontals, fan-shapes, bushes, etc. There are also short chapters on varieties grown for various purposes, methods of marketing, enemies, and finally, various receipts for cooking.

There are also chapters on the plum, cherry and mulberry. The book is beautifully printed and well illustrated, and should prove of most value to those for whom it was especially prepared. F. H. K.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

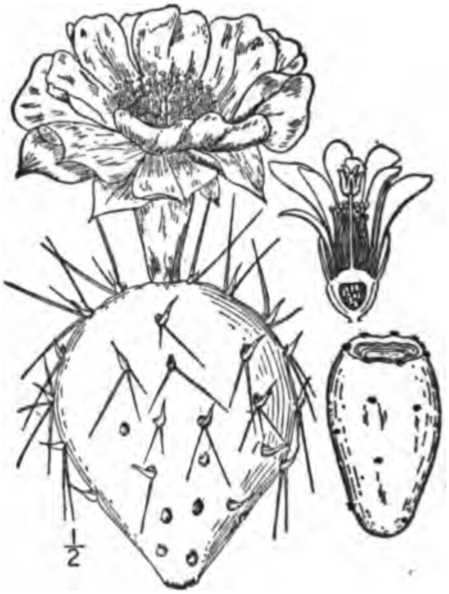
CHAPTER XXVI.—*Orders Opuntiales and Myrtiflorae.*

THE first-named order, which takes its name from the genus of cacti to which the prickly pear belongs, consists only of the following:

Family Cactaceae. Cactus Family. This very widely known group, perhaps the most distinctive of any of the plant families, comprises about 20 genera and 900 species, all of which are natives of the western hemisphere; many of them have, however, been naturalized in the Old World. Their chief characteristic is the extremely succulent tissue of which the plants are composed, making it possible for them to thrive in very arid regions. In fact, cacti are never to be found either in moist situations or in a humid climate.

In habit the plants also exhibit wide variation. A few have leafy stems, similar to those of most plants; but the great majority have swollen, spherical, jointed or angular stems, with practically no leaves whatever, the latter being represented by minute spines and their place being taken by clusters of sharp spines. The flowers are usually regular, with a calyx of numerous combined sepals, and a corolla of numerous petals. The stamens, which have very long filaments, are also innumerable. The ovary is one-celled with a single style and several stigmas. The fruit is fleshy and frequently edible, with a pleasant subacid flavor.

On account of the ease with which they may be cultivated, the oddity of their shapes and the beauty of their flowers, the Cactaceae have always been popular as house plants. The genus *Cereus* stands pre-eminent in the number of species and variety of flowers. Everyone is familiar with *Cereus grandiflorus*, the "night-blooming" Cereus, and those who have traveled through the desert regions of Arizona and New Mexico have observed the tall columnar stems of the giant cactus (*C. giganteus*) indigenous throughout that region. Scarcely less interesting are the various forms of prickly-pears (species of *Opuntia*), which serve a number of useful purposes in the countries where they grow. The tuna (*O. Tuna*) is used as a hedge, and the young juicy joints of this, after the spines have been singed off, are eaten by cattle. *O. Ficus-*



Western prickly pear (*Opuntia humifusa*). After Britt. & Brown Ill. Fl. Northeast U. S.

Indica, which now occurs throughout Southern Europe, is the food plant of the cochineal insect. Our own native Opuntias are highly ornamental in the dry fields and rocky ledges when covered in early summer with a mass of yellow flowers. The genus *Echinocactus* is noted for its very formidable hooked spines; while *Cactus* (*Mamillaria*), a genus in which the plants are of small size and the flowers of bright colors, is particularly desirable in pot cultivation.

The order MYRTIFLORAE, or MYRTALES, may be known by the gamosepalous calyx, the sepals being joined together, and by the compound ovary, to which the calyx is usually adnate. There are 16 families, of which the most important are the Thymelaeaceae, Lythraceae, Rhizophoraceae, Combretaceae, Myrtaceae, Melastomaceae and Onagraceae.

Family Geissolomaceae. Geissoloma Family. Consists of a single genus, *Geissoloma*, confined to the Cape of Good Hope. They are low shrubs of no particular interest.

Family Penaeaceae. Consists of about 5 genera and 20 species, also natives of South Africa. The parts of the flower are in fours, and the ovary affords an exception to the usual rule in the order, in that it is superior to, or free from, the calyx.

Family Oliniaceae. Olinia Family. Another family with a single genus, native of the same region.

Family Thymelaeaceae. Mezereon Family. Shrubs or trees with peculiarly tough inner bark. They have entire leaves, and flowers with a cylindric calyx, the corolla being frequently wanting; the stamens are 4–5 or twice as many, borne on the calyx. There are about 37 genera and 425 species, the family being largely represented in Australia and South Africa, but some of the genera exhibiting a wide distribution. One of the largest is *Daphne*, species of which are found in the temperate portions of nearly every continent. *D. Mezereum* is well-known in Europe and cultivated for its fragrant pink flowers, appearing in spring before the leaves expand. The bark of this and the Spurge Laurel (*D. Laureola*) has been used in medicine; it is exceedingly acrid. A very good quality of paper is manufactured from the tough inner bark of certain Asiatic species.

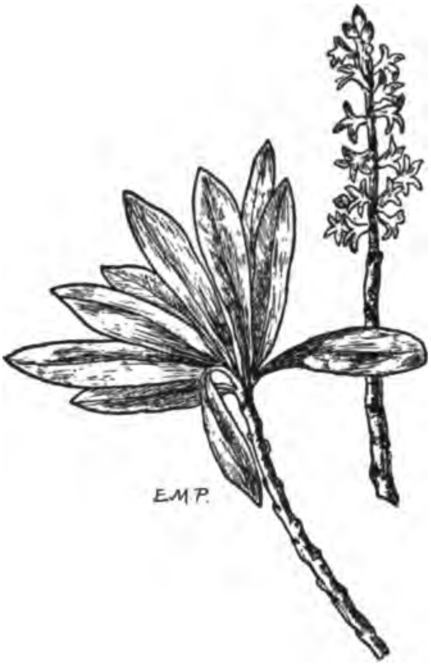


Fig. 168. European Mezereon (*Daphne Mezereum*).

In the United States the family is represented by the leather-wood or moosewood (*Dirca palustris*) a shrub with small yellow flowers and withe-like stems. In Australia, *Pimelea* comprises many species, some of which are ornamental in cultivation.

Family Elaeagnaceae. Oleaster Family. Contains 3 genera and about 20 species of wide distribution. They are shrubs or trees, peculiar and conspicuous on account of their silvery-scaly foliage. The flowers are variously clustered and dioecious, the staminate flowers with a 4-parted calyx and 4 or 8 stamens, the pistillate with the upper portion 4-lobed and deciduous, the lower half enclosing the ovary and persistent; corolla wanting in both kinds of flowers. The fruit is a berry-like drupe.

Elaeagnus, the oleaster or wild olive, is represented in North America only by *E. argentea*, the silver berry of the Western States. In Europe a number of species are in cultivation, and one, *E. longipes*, produces a fruit which is edible, and which has grown more popular as it has become more widely introduced. *Lysargyraea*, the buffalo berry, consists of three species, all North American shrubs. *Hippophae*, of similar aspect, belong to the Old World.

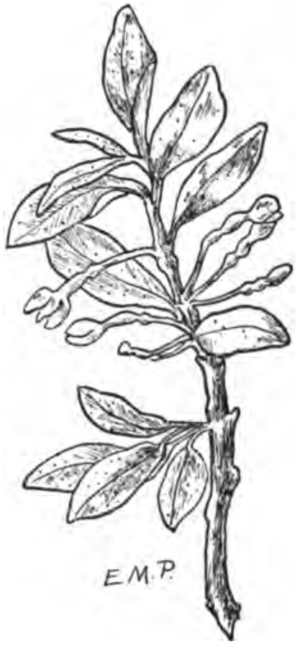


Fig. 169. Japanese Goumi (*Elaeagnus longipes*).

Family Lythraceae. Loosestrife Family. Contains about 21 genera and 350 species of very wide distribution. They are herbs, shrubs or even trees, mostly with opposite leaves. The flowers have petals as many as the lobes of the calyx, on which they are borne, or the corolla sometimes entirely wanting. Stamens as many as the calyx-lobes. Fruit a capsule, with 1–several cells.

The Loosestrifes proper (*Lythrum*) are herbs with somewhat weedy aspect, of which *L. Salicaria* is common to both Europe and America. The very large genus *Cuphea*, containing numerous Mexican species, exhibiting great diversity in the form and coloration of their flowers, which are irregular in shape, is represented in the United States only

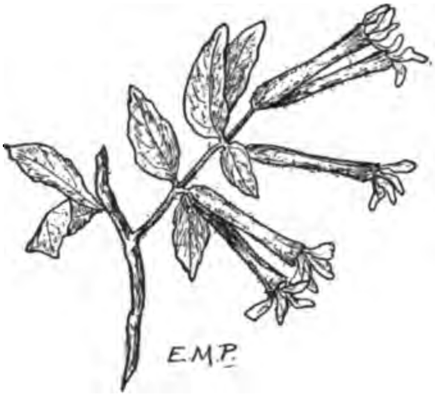


Fig. 170. Firey Cuphea (*Cuphea Llavæ*).

by the clammy cuphea, a troublesome weed with insignificant flowers. *Lagerstroemia*, the crape myrtle, is probably the most highly ornamental shrub of the Southern States. Originally introduced from Southern Asia, it has been so commonly cultivated that it has become spontaneous in many places. The leaves are dark glossy green, and the delicate pink flowers, produced in lilac-like masses, have a texture similar to crape, the petals being borne on long claws and beautifully fringed.

Family Sonneratiaceae. Sonneratia Family. Consists of a single genus *Sonneratia*, with about eight species, natives of India and the Malay archipelago. They are trees with opposite leaves, large terminal flowers distinguished from those of the preceding family by the numerous stamens, and a berry-like fruit. The kambala, *S. apetala*, furnishes a strong, close-grained wood, used in the manufacture of packing-cases.

Family Punicaceae. Pomegranate Family. This group, of which the pomegranate is the type, was formerly included in the Lythraceae, but is separated from that family on account of the peculiar structure of the fruit, which consists of two rows of capsules, placed one above another. The numerous seeds are enveloped in a transparent, mucilaginous coating. The flowers are highly ornamental, being usually a vivid scarlet, while the fruit is yellow, tinged with orange. The flavor is pleasant, and moderately acid. Pomegranates are natives of Asia and Africa, but they may be cultivated wherever the climate is sufficiently mild.

Family Lecythidaceae. Brazil-nut Family. A group of large tropical trees comprised in 7 genera and about 130 species. They are natives of South America, having large showy flowers, the stamens in which are frequently united into a plate, woody capsules, and almond-like seeds. The Brazil-nut is a familiar example; its fruit, partly sectioned, is shown in Figure 171.

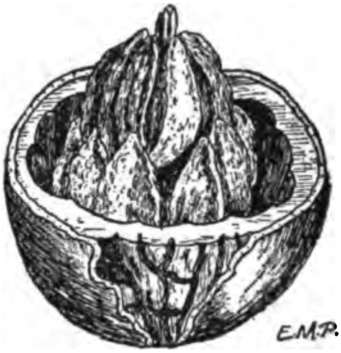


Fig. 171. Fruit and seeds of the Brazil Nut (*Bertholletia excelsa*) greatly reduced.

Family Rhizophoraceae. Mangrove Family. This interesting group consists of about 14 genera and 50 species, shrubs or trees, some of which are not strictly maritime like the true mangroves. The great interest attaching to the latter lies in the fact that the seeds germinate while the fruit remains attached to the parent plant and the radicle projects downward like a plummet, ready to secure prompt attachment in the loose mud upon which it finally falls. The flowers have both calyx and corolla, each of 4 parts, the stamens as many or twice as many. The capsular fruit contains one or few seeds.* The mangroves proper belongs to the genus *Rhizophora*, but several related genera have the same habit. The family is distributed through the tropics of both hemispheres.

Family Combretaceae. Myrobalan Family. Contains about 23

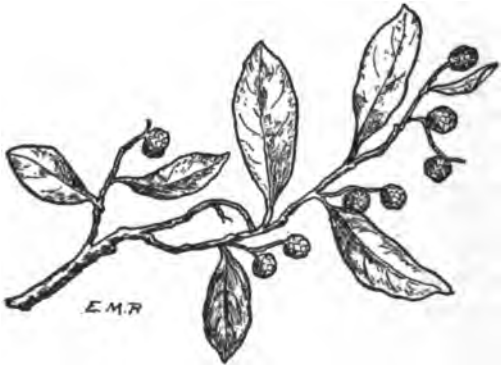


Fig. 172. White buttonwood (*Conocarpus erecta*).

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* See article by the author in the present number of this journal, on "Plant Agencies in the Formation of the Florida Keys," for an account of the mangrove.

genera and 200 species. They are trees or shrubs with opposite leaves, and flowers frequently exhibiting an odd system of irregularity in that the stamens may be wanting, the petals, or the pistil. Calyx 4–5-lobed, the upper portion falling off. Petals borne on the calyx, alternating with its lobes. Stamens as many or twice as many. Ovary 1-celled. Fruit dry or fleshy, 1-celled and 1-seeded.

The plants are widely distributed in the tropics, and, as a whole, possess astringent properties. Some, such as the Indian almond tree (*Terminalia Catappa*), are cultivated for ornament; others yield good timber. Several of the genera resemble the true mangroves in developing aerial roots; a few are lianas.

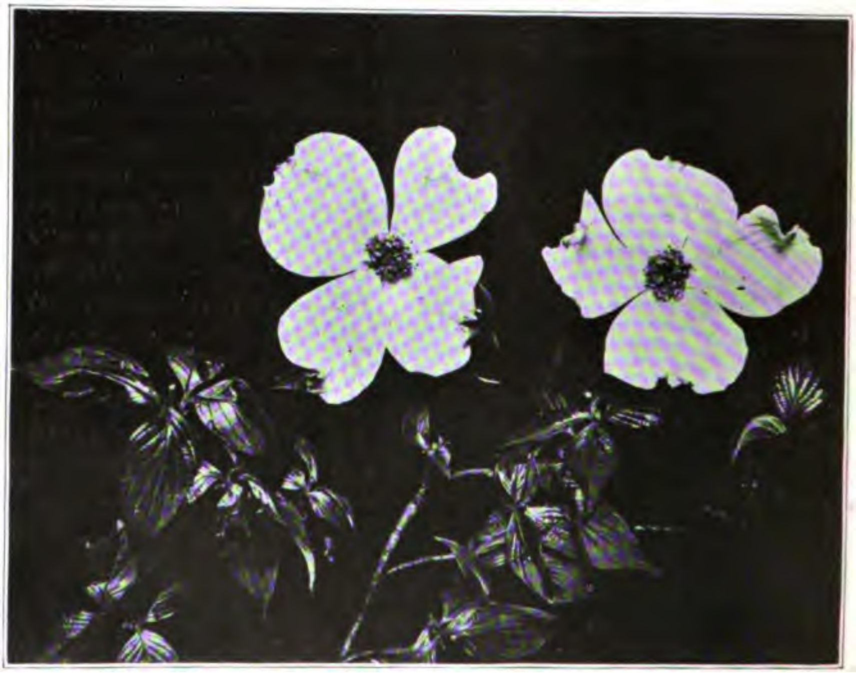

Fig. 178. The Flowering Dogwood (*Cornus florida*).
After Photograph by Carl Krebs.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

Chapter XXVI.—*Continued.*

FAMILY Myrtaceae. Myrtle Family. A vast and important family of nearly 100 genera and some 1700 species. They are trees or shrubs with entire, usually opposite and dotted leaves, these often having an intra-marginal vein. The flowers are borne in terminal or axillary racemes, panicles or rarely cymes, the individual flowers being perfect and regular, with the tubular calyx somewhat cohering at the apex and bearing the petals alternating with its lobes. The stamens are also inserted with the petals and are twice as many or oftener indefinite in number. The 1–6 celled ovary is adherent to the calyx and in fruit becomes dry or fleshy.

This family is widely distributed throughout the world, mainly in

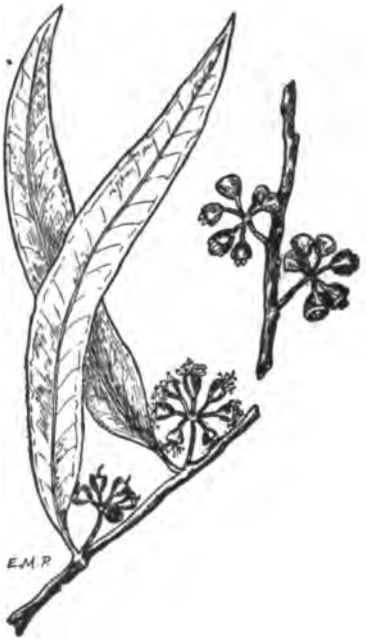

Fig. 173. Flowering Branch of *Eucalyptus rostrata*.

the tropics, with a few forms extending into temperate lands. North America, for instance, has but 4 genera and about a dozen species, and these mostly confined to Florida. Australia possesses a number of peculiar and striking genera, among them *Eucalyptus*, a genus embracing about 160 species. They are usually tall trees, with narrow, leathery leaves. One species, the white peppermint-tree or giant gum-tree (*E. amygdalina*), is, according to the late Baron von Mueller, probably the loftiest tree on the globe, attaining a height of 475 feet and a diameter of 15 feet. This and many other species of *Eucalyptus* are of the greatest economic importance, furnishing timber for a wide variety of uses, as well as various oils, resins, acids, tannin, etc. *Eucalyptus* is thought to be of value in malarial regions in absorbing or warding off noxious emanations; hence, several are known as fever trees. Some 70 or 80 species of *Eucalyptus* have been more or less extensively introduced on the Pacific Coast, but only a few, such as *E. polyanthema*, *E. globulus* and *E. robusta*, are most abundant; all are of rapid growth.

Among the many economic products of this family we may mention allspice or pimento, the product of *Eugenia Pimenta* or *Pimenta officinalis*, a tree of Mexico and the West Indies. Allspice consists of the fruits gathered before they are quite ripe and dried in the sun. The cloves of commerce are the dried flower buds of *Eugenia caryophylla*, a tree originally of the Moluccas, but now widely cultivated in the East and West Indies. The guava tree (*Psidium Guajava*) of tropical America produces the well-known guava fruits of tropical countries. The myrtle of the ancients is *Myrtus communis*, a tree of the Mediterranean region.

Family Melastomaceae. Melastoma Family. This is also an immense family, which embraces about 150 genera and 2500 species. They are herbs, shrubs or trees, with mainly opposite 3–9-ribbed leaves with-

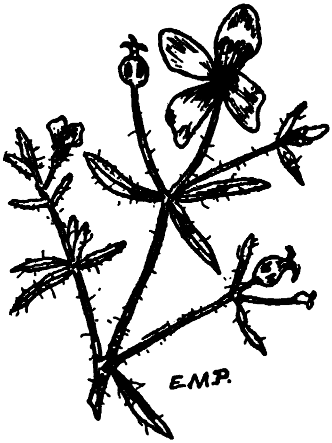

Fig 174. The Yellow Deer-grass (*Rhexia lutea.*)

out stipules, and showy flowers, which are regular and perfect. The calyx is urn-shaped, 4–6-lobed, persistent and joined with the ovary below or with its angles. The petals, also 4–6 in number, are inserted with the 4–12 stamens on the throat of the calyx. The ovary is 2–many-celled and becomes in fruit a berry or a capsule.

This family is mainly tropical in its distribution, being especially abundant in Central and South America. Only a single genus (*Rhexia*) and less than a dozen species are North American. They are perennial herbs, usually 1–2 feet in height, with 3–5-ribbed leaves and handsome terminal purple, whitish or rarely yellow flowers. They delight in meadows and swamps and are known popularly as meadow-beauties or deer-grass.

In spite of the great number of genera and species the melastoma family is of no particular economic importance. It affords a number of showy greenhouse plants, among them certain tropical species of of *Rhexia*, species of *Miconia*, a large tropical American genus of shrubs or trees, cultivated for their large, showy, strongly veined leaves, and *Bertolonia*, a genus of dwarf shrubs from Brazil, also grown for their beautiful foliage.

Family Onagraceae. Evening-primrose Family. They are annual or perennial herbs, rarely shrubs, with alternate or opposite exstipulate leaves, and axillary spikes or racemes of perfect, mostly regular flowers. The calyx-tube is joined to the ovary or prolonged beyond it and usually 4-lobed. The petals are 2–9, but usually 4 in number, and inserted with the stamens (the same or twice as many) on the summit of the calyx-tube. The ovary, usually 4-celled, becomes a capsule or nut in fruit. This family includes about 40 genera and 350 species, of wide geographic distribution, but most abundant in America, there being about 30 genera and nearly 250 species in North America north of Mexico. Many of these are weeds of no particular account. Among the most interesting is *Epilobium*, the willow herbs, which spring up so quickly in ground recently burned over. They bear purple 4-parted flowers. *Oenothera*, the evening primrose, is a small genus of low herbs with showy, 4-parted yellow flowers. Allied to this are several genera bearing very large, showy, white, pink or yellow flowers. Among the plants of this family in cultivation *Fuchsia* is pre-eminent. It is a genus of 60 or 70 species, the greater part from tropical America, but with 3 or 4 in New Zealand. They are known to us mainly as tender herbs or sub-shrubs, but in their native countries they are shrubs and one, *Fuchsia excorticata*, of New Zealand, is a tree 30–40 feet in height. The number of forms in cultivation is very great, but they have apparently been produced by hybridizing a relatively small number of species.

Family Haloragidaceae. Water-milfoil Family. A small family of

8 genera and about 94 species, of wide geographic distribution. They are herbs, mainly aquatic, with alternate or whorled leaves and small flowers. The mare's-tail or bottle-brush (*Hippuris vulgaris*), the mermaid-weed (*Proserpinacea*) and the several species of water-milfoil (*Myriophyllum*) are common in our ponds, lakes and streams. Among the few terrestrial forms *Gunnera* is noteworthy. They are magnificent lawn foliage plants, the leaves of *G. marveata* being from 5–10 feet across, and the crown of great leaves spreading 25 feet or more.

Family Cynomoriaceae. Cynomorium Family. A single genus and species (*Cynomorium coccineum*), of the Mediterranean region and Western Asia. It is a fleshy red herbaceous plant about a foot in height.

CHAPTER XXVII.—Order UMBELLALES.

This is a small but interesting and relatively important order, embracing three families. They are herbs, shrubs, or trees, and almost always have petaliferous flowers. Calyx-segments and petals mostly 5, stamens 4 or 5. The ovary is inferior, adnate to the calyx, compound, and has a single ovule in each cell.

Family Araliaceae. Ginseng Family. A family of herbs, shrubs or trees of about 50 genera and 450 species, widely distributed in temperate and tropical regions. North America possesses only 3 genera and about 10 species. They have alternate or whorled leaves, and mostly perfect flowers in umbels, heads or racemes. The calyx-tube adheres to the ovary and has the usually 5 petals inserted in its margin. Stamens as many as the petals and alternate with them. Fruit a berry or drupe resulting from the 1–several celled ovary.

Aralia is perhaps the most important genus. They are herbs, shrubs or trees with pinnately or ternately decompound leaves. *Aralia spinosa*, the Hercules' club, a tall shrub or small tree of Eastern North America, has the stem, branches and petioles strongly spiny; *A. racemosa*, the American spikenard, is an unarmed herbaceous plant 3–6 feet high, and *A. nudicaulis* is the wild or Virginia sarsaparilla which is quite widely employed in medicine. Several other species of *Aralia* are in ornamental cultivation, mainly as greenhouse plants. *Panax* is a genus of about 7 species, natives of Eastern North America. They are erect perennial herbs from globose or elongated aromatic roots. American ginseng (*P. quinquefolia*), of rich woods, is gathered in large quantities for exportation to China, where it is highly prized for its tonic, aromatic properties and commands high prices. The only other American species

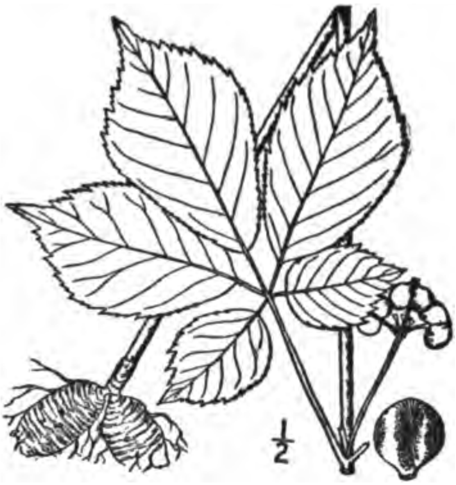

Fig. 175. Ginseng (*Panax quinquefolia*). After Britt & Brown, Ill. Fl. Northern U. S.

is the dwarf ginseng or ground-nut (*P. trifolium*), a smooth herb only 3–8 inches in height. The widely known English ivy (*Hedera Helix*) is also a member of this family. It is a native of the Old World, but is now grown in many varieties in nearly all parts of the world. The celebrated rice paper of the Chinese is made from the pith of *Fatsia papyrifera*. It is about 10 feet in height and 4 inches in diameter, with a white elder-like pith an inch or more in diameter. A number of other genera, as *Acanthopanax*, *Polyscias*, etc., are in ornamental cultivation.

Family Umbelliferae. Carrot Family. A large, widely distributed family of 170 genera and about 1600 species. They are herbs, often strongly scented, with alternate, mostly compound leaves and small, often inconspicuous flowers borne usually in single or compound umbels. The calyx-tube is short, joined with the ovary and bears the 5 petals on its margin. The stamens are also 5, but borne on a disk which surrounds the pistil. The fruit is dry and composed of two flattened carpels. Although closely circumscribed as a family, the genera and, species are often limited and discriminated with great difficulty.

This is on the whole an important family and supplies a number of edible plants, as the carrot, celery, parsnip, caraway, parsley and coriander; and in old gardens, lovage and fennel are grown for their sweet-aromatic foliage. Poison hemlock (*Conium*) water parsnip (*Sium*) and water hemlock (*Cicuta*) are rank-growing, ill-scented poisonous plants, not infrequently causing the death of persons eating the roots or stems.

Family Cornaceae. Dogwood Family. A small but interesting group of about 16 genera and 85 species. They are shrubs or trees with simple leaves and regular flowers in cymes, heads, or rarely solitary, and

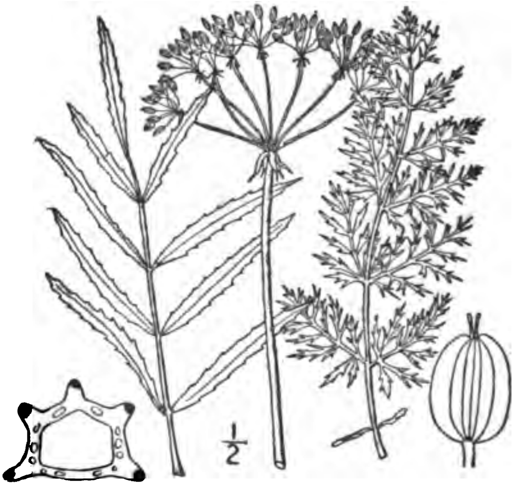

Fig. 176. Hemlock Water-parsnip (*Sium cicutaefolium*). After Britt & Brown, Ill. Fl. Northern U. S.

surrounded by an involucre. They are most abundant in the northern hemisphere, North America possessing 3 genera and about 35 species. Of these, the best known and most abundant is *Cornus*, including the dogwoods or cornels. About 18 species are found in this country, the most conspicuous being the flowering dogwood (*C. florida*). A common species of low, cold northern woods is the little bunch berry (*C.*

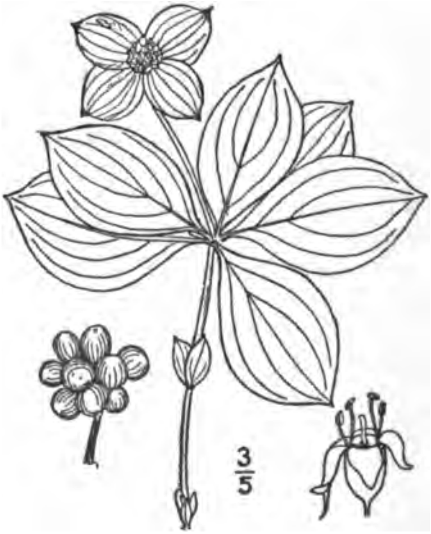

Fig. 177. Dwarf Cornel (*Cornus Canadensis*). After Britt & Brown, Ill. Fl. Northern U. S.

Canadensis) and its close relative, *C. Suecica.* Another common species along streams and swamps is the red-osier dogwood (*C. stolonifera*). The genus *Nyssa* includes mainly trees, *N. sylvatica,* being the pepperidge, sour gum or tupelo, *N. biflora,* the water tupelo, and *N. aquatica,* the cotton or tupelo gum. *Aucuba Japonica,* a glossy, evergreen shrub from Japan, is common in cultivation. *Garrya* is the only other North American genus.

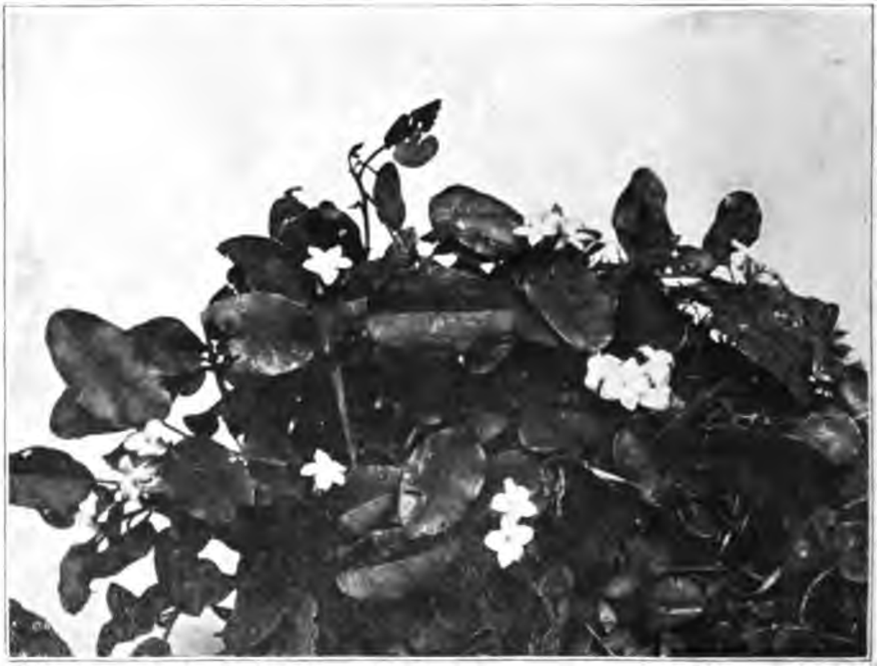

Fig. 178. The Mayflower (*Epigaea repens*).
After Photograph.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXVIII.—*Order Ericales.*

IN Chapter X (p. 70) of the Supplement, it will be remembered that the distinctions between the two main divisions of dicotyledonous plants, the Archichlamydeae and Metachlamydeae, were explained at length. We have now discussed all the orders and families comprised in the first named group, or those in which the corolla in the flower is either wanting entirely, or composed of separate pieces (petals). We now pass to the consideration of a higher type of floral structure, viz., that in which the corolla-segments are united into a single piece,—wherefore the group is sometimes called *Sympetalae* or *Gamopetalae.* It must not, however, be supposed that the union of petals is always complete. In the earlier families of the series, such as those discussed in the present chapter, the coherence is very slight or the petals are in some cases actually distinct. From this condition to the long tubular or funnel form corollas of the Convolvulaceae, for instance, there is every gradation.

The order Ericales is characterized by the superior ovary, free from the calyx (except among the blueberries, Vacciniaceae), and by the stamens which are free from the corolla, alternate with its lobes, and as many or twice as many as the latter. The families included are the Clethraceae, Pyrolaceae, Lennoaceae, Ericaceae, Epacridaceae and Diapensiaceae, all of which are very closely related, the first four having been formerly regarded as a single family, the Ericaceae.

Family Clethaaceae. White Alder Family. A single genus, *Clethra,* of about 30 species, inhabiting eastern North America, the Central and South American region, and Japan. They are shrubs and trees, with whitish or canescent foliage resembling in shape that of the alder. The flowers, which are borne in long, narrow racemes, are usually delightfully sweet-scented. The sepals and petals are 5, the latter only slightly united at the base. Stamens 10. Ovary 3-celled and 3-angled, becoming in fruit a 3-valved loculicidal capsule.

The sweet-pepper bush is one of the summer-flowering shrubs in our eastern States. Its spicy racemes of white flowers are borne in great profusion, and are very attractive to insects. The genus contains about 25 species, distributed through East Asia and the Canary Islands, besides North America.

Family Pyrolaceae. Wintergreen Family. Includes 3 genera and about 20 species, all natives of the northern hemisphere. They are low perennial herbs, usually evergreen, with white or pink flowers, having a 4–5-lobed calyx, a 4–5-parted corolla, stamens twice as many as the lobes, and a several-celled ovary, becoming in fruit a loculicidal capsule. While the corolla is usually quite regular, the style is often declined or bent downward, giving the flower a one-sided appearance. The true wintergreen or checkerberry (*Gaultheria*) oddly enough does not belong to this family, but to the heath family. The *Pyrolas* are round-leaved plants, with flowers in racemes, and leaves all basal. *Moneses*, a monotypic genus, differs from *Pyrola* in having a one-flowered scape. The remaining genus of the family, *Chimaphila*, is known popularly by its original Indian name, "pipsissewa," though it is also called prince's pine. It has leafy stems and white or purplish flowers borne in corymbs rather than in racemes. There are six species, natives of North America, Mexico and Asia.

Family Monotropaceae. Indian-pipe Family. What rambler in the June or July woods has failed to observe the clusters of Indian-pipe just breaking through a mass of sodden and decayed leaves? And what other flower could bear so appropriately the suggestive designation of "corpse-plant?" Its looks certainly do not belie its nature, for in common with all other members of the family it is a saphrophyte, or in other words, a plant deriving its sustenance from decaying vegetable matter, like most of the fleshy fungi. There are about 9 genera and a dozen species in the Monotropaceae, and they are nearly all natives of the northern hemisphere. The flowering scapes are entirely destitute of leaves, bearing only small scales; the whole plant is waxy white, yellowish or red in color. Flowers erect or nodding, with a 2–6-parted calyx and 3–6-parted corolla, which in one California genus is entirely wanting.

The snow plant of the Sierras (*Sarcodes sanguinea*) has been described and figured in THE PLANT WORLD for November, 1900 (IV., Pl. XVIII) and will serve as a good general type of the family.

Family Ericaceae. Heath Family. We pass now to a large group, formerly thought to include all three of the families discussed above, but, as now understood, comprising about 55 genera and over 1000 species. They are herbs, shrubs or trees of very wide distribution, but most abundant in cool latitudes. The flowers may be distinguished by the free, 4–5-parted and usually persistent calyx, and by the regular

4–5-parted corolla. The stamens are equal to, or a multiple of the lobes of the latter, and are hypogynous. The anthers are 2-celled, often tipped with a horn or appendage as in the blueberries. The ovary is 2–5-celled, becoming in fruit a loculicidal or septicidal capsule, a berry or a drupe.

In Europe and Africa, the heaths are among the most conspicuous plants, whole tracts being often covered with a single species. These belong to the genus *Erica,* which is not represented in the New World; but *E. cinerea* and *E. Tetralix* have become sparingly naturalized on the island of Nantucket, along with the Scotch heather (*Calluna vulgaris*). Many South African forms of great beauty are seen in cultivation in European hot-houses.

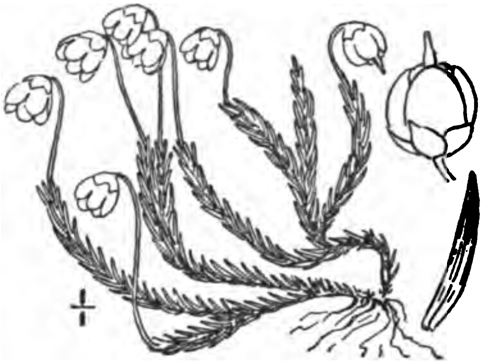

FIG. 179. An American Heath (*Cassiope tetragona*). After Britton and Brown, Ill. Fl. Northeast U. S.

The azaleas and rhododendrons form another extensive group of ornamental plants. They are conspicuous and brilliant along the summits of the higher Alleghenies and also in the Himalayas and Alps. The flowers exhibit a wide range of color, from the purest white to the deepest crimson, and all shades of yellow and orange. Probably our most beautiful azalea is *A. lutea,* the flame azalea, with flowers of a dazzling flame color. In the same class of ornamental shrubs may be ranked the mountain-laurel (*Kalmia*), which often grows with the rhododendron; its flowers are quite different, however, in structure. The ten stamens, when the corolla first opens, are bent back like bows, the anther sacs fitting in little depressions or pockets on the corolla lobes. The slightest touch at the bases of the sensitive filaments by some prowling insect in search of honey causes them to spring back, deluging the visitor with a shower of pollen and thus ensuring cross-fertilization.

In the far northern regions and on the highest mountains the heaths seem to luxuriate, and many of the genera have their exclusive homes in such regions. Among these may be mentioned *Ledum*, the Labrador tea; *Cassiope*, *Chamaedaphne*, *Phyllodoce* and *Andromeda*. Others are characteristic of the Pacific States, as the madroña (*Arbutus Menziesii*), a handsome tree only distantly related to the beautiful mayflower, which is often incorrectly called arbutus. The mayflower, by the way (*Epigaea repens*), is one of those peculiar plants in which there are but two species, one of eastern North America, the other of Japan. The accompanying plate, taken from a photograph, is an unusually good picture of this dainty little flower.

The economic interest in the Ericaceae centres chiefly in those genera whose fruit is a berry rather than a capsule, as in the blueberries and their allies (*Vaccinium*). The latter genus is represented by a large number of species, most of which have edible fruit. Of less value, but still useful, particularly when cooked, are the huckleberries, derived from species of *Gaylussacia*. The writer is often asked the difference between a blueberry and a huckleberry, and it is true that in many parts of the country, particularly in New England, the terms are used synonymously, and applied indiscriminately to both *Vaccinium* and *Gaylussacia*. As a matter of fact, while the two genera are sufficiently distinct in structural characters, it is hard to draw a line of popular demarcation. Both fruits contain what appear to be seeds, but in *Gaylussacia* they are really one-seeded nutlets, or little stone fruits. There is no color criterion, for while most *Vacciniums* have blue fruits and most *Gallussacias* black, there are exceptions in each of the two genera.

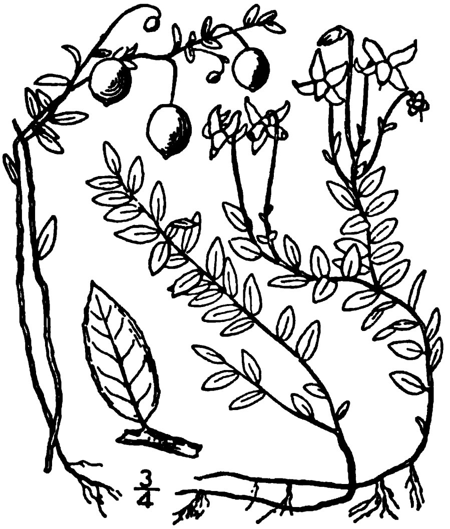

FIG. 180. The Small Cranberry (*Oxycoccus Oxycoccus*). After Britton and Brown, Ill. Fl. Northeast U. S.

The cranberry belongs to the genus *Oxycoccus*, and the cranberry industry is an important one on Cape Cod and in parts of New Jersey. Besides the cranberry of commerce we have one or two wild species. The checkerberry or true wintergreen (*Gaultheria*) produces a fruit that appears to be a true berry, but in reality the fleshy part consists of the enlarged fruiting calyx, enveloping the ovary.

It should be stated that many of the heaths contain toxic alkaloids, rendering their herbage poisonous to stock; and it is on this account that the narrow-leaved laurel of our northern States (*Kalmia angustifolia*) is known as "sheepkill" or "lambkill."

Family Epacridaceae. Australian Heath Family. This group, which is almost exclusively confined to Australia, contains about 32 genera and 350 species, all shrubs or undershrubs of heath-like aspect and entirely replacing the Ericaceae in that region. They differ from the latter in the uniformly 5-parted corolla, the 1-celled anthers without appendages of any sort, and in the attachment of the corolla. Several genera, notably *Epacris*, *Leucopogon* and *Styphelia*, are sometimes cultivated in greenhouses. Some yield edible berries.

Family Diapensiaceae. Diapensia Family. Includes 6 genera, most of which are monotypic, all being natives of the northern hemisphere. They are low shrubs or scapose herbs, with white, pink or purple flowers and simple leaves. The calyx or corolla have their parts in fives; the stamens also are 5, borne on the throat of the corolla. Ovary 3-celled, becoming a 3-valved capsule. Nearly all the genera of this family are interesting on account of their remote or local distribution. Thus *Diapensia* is found around the Arctic circle and on the higher mountains of northern New England; it is a tufted undershrub with solitary white or pink flowers. *Pyxidanthera* or "pyxie," a monotypic genus, occurs in pine barrens, principally in New Jersey; the small evergreen leaves and delicate flowers, borne in profusion at the ends of the branchlets, cause it also to be known as "flowering moss."

Within the last few years florists have been using extensively for winter decoration quantities of large round leaves not unlike those of the water lily, exhibiting beautiful shades of purple and green. These leaves are those of *Galax aphylla*, another plant of this family, the genus being also monotypic. It is common throughout elevated regions in the southern States, producing from a thick rootstock a number of the handsome leaves and in spring a raceme of small white flowers.

Undoubtedly the genus of greatest interest, however, is *Shortia*. Originally described by Dr. Gray from a specimen without flowers, found in the mountains of South Carolina, the plant disappeared absou tely from view, and for many years all the efforts of collectors to rediscover it were in vain. Finally, however, one enterprising individual found a supply, which he disposed of at high prices to the herbaria of the world. Since that time it has been introduced into cultivation, and is no longer difficult to obtain, although still rare in the wild state. Another species occurs in Japan.

S. galacifolia, our own species, is a handsome little perennial, with solitary white flowers and round, Pyrola-like leaves.

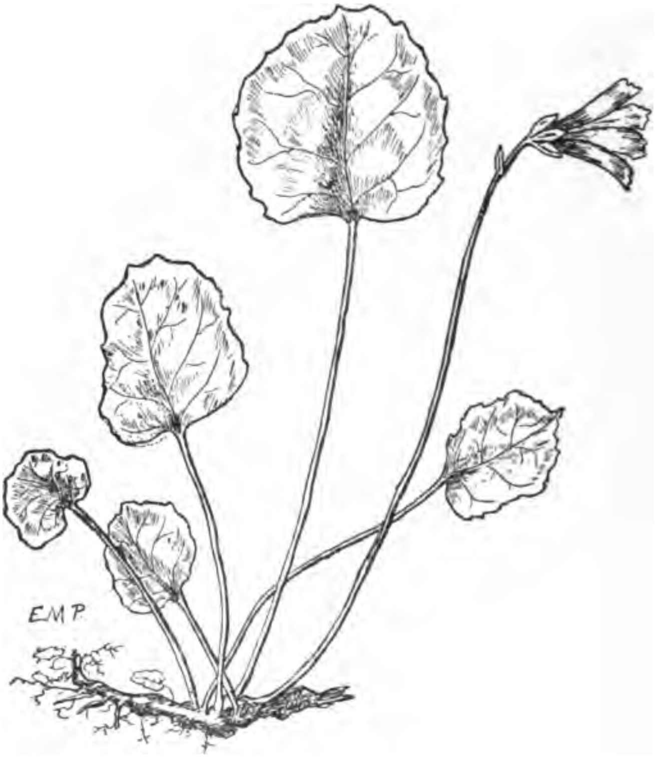

FIG. 181. *Shortia galacifolia*, for a long time considered one of the rarest North American plants. Original.

SUPPLEMENT.

THE FAMLIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXIX.—*Orders Primulales and Ebenales.*

THE Primulales consist of two families, Primulaceae and Plumbaginaceae. The order differs from the Ericales, described in the last chapter, mainly by the position of the stamens, which are borne on the corolla opposite the lobes of the latter instead of being alternate with them. In both families the calyx is free from the ovary.

Family Myrsinaceae. Myrsine Family. Trees or shrubs with coriaceous (leathery) leaves and perfect or occasionally unisexual flowers. Calyx and corolla 4-5-cleft; stamens equal to the corolla lobes and inserted opposite them; ovary 1-celled, becoming a 1-many-seeded, dry or fleshy fruit. There are about 30 genera and 500 species, natives chiefly of tropical regions, and especially abundant, it is said, on islands

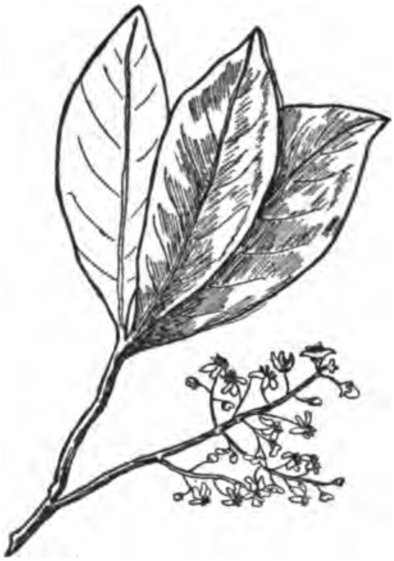

Fig. 182. Flowering branch of *Icacorea paniculata*, a Floridian shrub belonging to the Myrsinaceae. Original.

having an equable temperature. Three genera occur in Florida, one of them (*Icacorea paniculata*) being rather an ornamental shrub, with panicles of creamy white flowers. (Fig. 182.) Several species of this genus and of *Myrsine* are cultivated in greenhouses, but the family is not, as a whole, remarkable for economic or other uses.

Family Primulaceae. Primrose Family. Contains about 28 genera and 350 species, widely distributed. All are herbs, with regular flowers, the calyx and corolla each 5-cleft or 5-parted, the stamens also 5. Ovary 1-celled, becoming a 2-6-valved capsule in fruit. There is one genus (*Glaux*) in which the corolla is entirely wanting.

The largest genus is the type of the family (*Primula*), containing

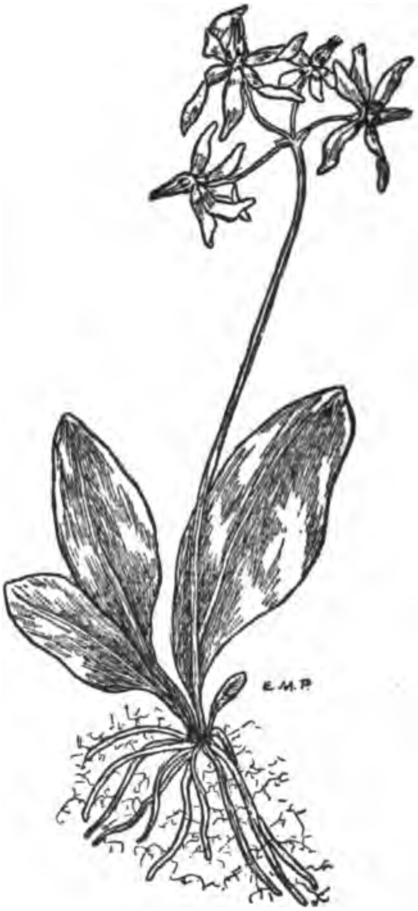

FIG. 184. The Shooting Star (*Dodecatheon Meadia*), considerably reduced. Original.

over 150 species, more abundant in the Old World than in North America. They are scapose, with a tuft of basal leaves and several or many umbelled flowers of many different colors, ranging, moreover, in size from the tiny dwarf Canadian primrose to the stout English cowslip (*P. veris*). An east Asiatic species (*P. obconica*), called the Chinese primrose in cultivation, has furnished many horticultural varieties. The most attractive of our native forms is Parry's primrose,* which is found in abundance throughout the Rocky Mountain region. The yellow loosestrifes (*Lysimachia*) are familiar weeds in our Eastern states. *Cyclamen*, which also belongs to this family, is a well-known greenhouse plant; within the last few years florists have succeeded wonderfully in developing the size and substance of the flowers, and the colors are beautiful, embracing many shades of pink and blush-white. Mention

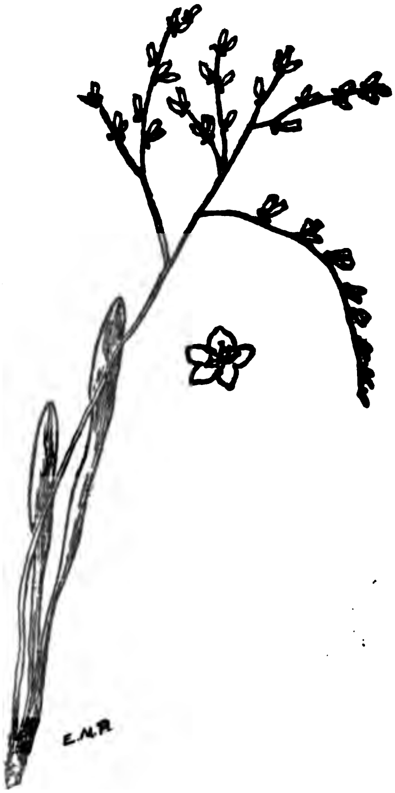

FIG. 185. The Marsh Rosemary (*Limonium Carolinianum*), greatly reduced. Original.

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*See article (with plate) by Dr. F. H. Knowlton, "A Primrose at Home." THE PLANT WORLD, 5:32. 1902.

should also be made of *Dodecatheon*, a beautiful native genus whose flowers resemble those of the Cyclamen. (See Fig. 184.)

Family Plumbaginaceae. Plumbago Family. Includes about 10 genera and nearly 350 species of wide distribution, a large portion of them maritime herbs. They have usually basal leaves and small clustered flowers, the calyx 5-toothed, its tube many-ribbed, the corolla with 5-clawed segments more or less united at the base. Stamens 5. Ovary 1-celled, but differing from that in the *Primulaceae* by having 5 styles; fruit an achene or utricle. *

Limonium, known as sea lavender or marsh rosemary, is a large genus, the species, however, very close and many of them doubtless intergrading. The numerous flowers, produced in fall, are white or purplish; they are familiar objects on our salt marshes. (Fig. 185.) *Statice*, the sea thrift or sea pink, is mainly of northern distribution. *Plumbago* prefers warmer climates and inland situations; one African species (*P. Capensis*), not uncommon in cultivation, has become extensively naturalized through the West Indies; it has spikes of white flowers with a long slender tube.

The order Ebenales includes the families Sapotaceae, Ebenaceae, Lynplocaceae and Styracaceae. It is hardly distinguishable from the preceding order except in that the plants are all shrubs or trees instead of herbs.

Family Sapotaceae. Sapodella Family. In the groups we have been examining, the various genera and species are useful chiefly from the aesthetic standpoint, having little or no economic value. But the Sapotaceae afford some very important tropical fruits and occasionally good timber. There are about 35 genera and 400 species, represented in our country chiefly by the genus *Bumelia* or buckthorn. In the West Indies there are three well-known fruit trees of this family. The Sapodilla (*Achras Sapota*) has fruit with a custard-like pulp and thick brown skin; its flavor is best when it becomes over-ripe. The Mamey Sapote or Mamey Colorado (*Lucuma Mammosa*) is a large tree with somewhat similar fruit, the flavor being rather less pronounced. One of the most beautiful trees of the tropics is the star apple or caimito (*Chrysophyllum cainito*). It has oblong leaves which are lustrous above and clothed with a velvety yellow pubescence beneath; the leaves catch the sun's rays and transform the tree into a veritable shower of gold. Its fruit is pleasantly flavored.

The seeds of many sapotaceous trees contain oil or vegetable butter in considerable amount. The best example of this class is the so-called shea butter tree (*Butyrospermum Parkii*) of central Africa. The wood of many is extremely hard and would be valuable in the arts, but as the Sapotaceae are preeminently trees of the virgin forest it is often impossible to utilize them. A kind of gutta percha is derived from *Mimusops Balata* of Guiana. Another species growing in South Florida (*M. Sieberi*) is known as wild sapodilla or "dilly," and the fruit is much prized by children, although it cannot be called of superior quality.

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* A utricle is a dry fruit with a membranaceous exocarp or outer covering.

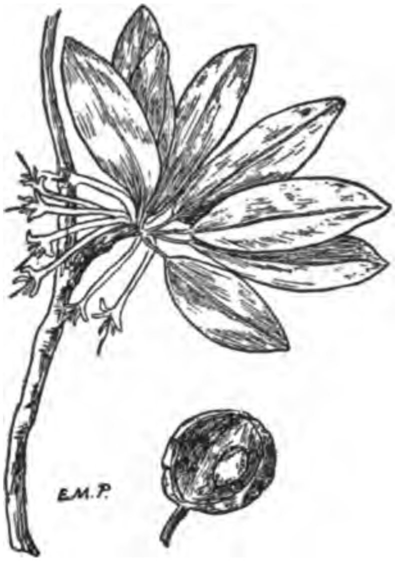

FIG. 186. The Wild Sapodilla (*Mimusops Sieberi*) showing flower cluster and section of fruit, the whole reduced. Original.

Family Ebenaceae. Ebony Family. Contains half a dozen genera and about 280 species, natives of warm climates. They are trees or shrubs, characterized in general by the coriaceous entire leaves, and perfect or unisexual flowers having a persistent 3–7-parted calyx, a 3–7-cleft corolla, and twice or thrice as many stamens. The 3-several-celled ovary becomes a fleshy berry in fruit. The trees of this family yield a hard and valuable wood, ebony being the product chiefly of an East Indian species of persimmon (*Diospyros*). Another species of the same genus affords the variegated Calamander wood of Ceylon. The edible fruit of *Diospyros* is familiar to every one who has lived in a persimmon region, and particularly to the luckless individuals (and their name is legion!) who have ventured to taste the attractive orange-colored berries before the frost has induced a partial decay. The Japanese persimmon (*D. Kaki*) is much larger and superior in flavor to our own.

Family Symplocaceae. Sweet-leaf Family. Trees or shrubs with broad entire leaves and mostly perfect, clustered flowers. Calyx-tube adnate to the ovary, 5-lobed above. Corolla 5-parted. Stamens very numerous, the filaments somewhat united at the base of each corolla-lobe. Ovary 2–5-celled, becoming a small 1-seeded drupe. The family consists only of the genus *Symplocos*, with about 175 species, natives of tropical regions and particularly abundant in tropical America. A single species, *S. tinctoria*, occurs in the southern United States; it is a pretty shrub, with large green leaves and bright yellow flowers. In Brazil an infusion of the leaves of some species is used as tea; nearly all contain a coloring matter or dye, as may be seen by the fact of the leaves turning yellow in drying.

Family Styracaceae. Storax Family. These also are shrubs or trees with regular, mostly perfect flowers, the calyx-tube partly adnate to the ovary and 4–5-cleft. Corolla 4–8-lobed, the lobes sometimes distinct, making it polypetalous. Stamens 8–10 or more, borne on the corolla, the filaments united at base. Ovary 2–5-celled, becoming in fruit a berry or a dry drupe, occasionally winged. The family contains about 7 genera and 75 species, mainly of the tropics.

Mohrodendron contains two species of exceedingly ornamental small

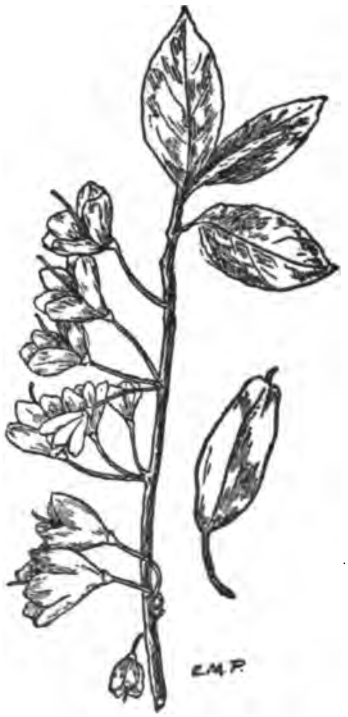

FIG. 187. The Silver-bell Tree (*Mohrodendron Carolinum*), showing flowers and fruit, reduced one-half. Original.

trees, natives of the southern states, and known as "silver bell" trees from the campanulate, snowy-white corolla. *M. dipterum* has a 2-winged, and *M. tetrapterum* a 4-winged, fruit. (Fig. 187.) There are also several native species of *Styrax*, which are also handsome shrubs; the flowers are usually very pubescent in this genus.

Storax is a balsamic resin derived from *S. officinale*, a native of the Levant. It is obtained by submitting the bark to heavy pressure, and was formerly extensively used by perfumers and also in medicine. Of late it has been supplanted by the product of the Asiatic sweet gum, *Liquidambar orientalis*. *Styrax Benzoin* yields the benzoin of commerce, which is still employed in the manufacture of perfumes and in medicine for pulmonary troubles.

CHAPTER XXX.—*Order Gentianales.*

This group contains the seven families: *Oleaceae*, *Salvadoraceae*, *Loganiaceae*, *Gentianaceae*, *Menyanthaceae*, *Apocynaceae* and *Asclepiadaceae*. The plants comprised in it may usually be distinguished by their opposite leaves, regular flowers with nerved corollas, stamens as many as the corolla-lobes and alternate with them (or fewer), and by the two distinct ovaries or 2-celled single ovary. The order as a whole is medicinal; it contains some useful, and not a few ornamental, plants.

Family Oleaceae. Olive Family. About 21 genera and 500 species, widely distributed. They are trees or shrubs with simple or pinnate leaves and 2–4-parted flowers, having the ovary superior and free from the calyx. In one genus (*Adelia*) and in many species of another (*Fraxinus*) the corolla is wanting. The fruit may be either a capsule, a samara (Key-fruit, like that of the maple) a berry or a drupe.

Olea Europea, the olive, is widely cultivated throughout Southern Europe, and is of considerable economic importance. It also thrives in Southern California. The fruit is a true drupe, consisting of a hard stone or endocarp, surrounded by a fleshy exocarp. The familiar lilac belongs to the genus *Syringa*, which affords another example of faulty popular nomenclature. The plant to which the name syringa is universally applied, namely, the mock orange (*Philadelphus*) belongs to an entirely dfferent family, and neither resembles, nor is in any way related to the lilac. *Fraxinus*, the ash, contains numerous species in Europe and America, most of which are handsome trees, with clean foliage, and very popular for park planting. One of the most beautiful of our native shrubs, the fringe-tree (*Chionanthus*) also belongs to this family. (Fig. 188.)

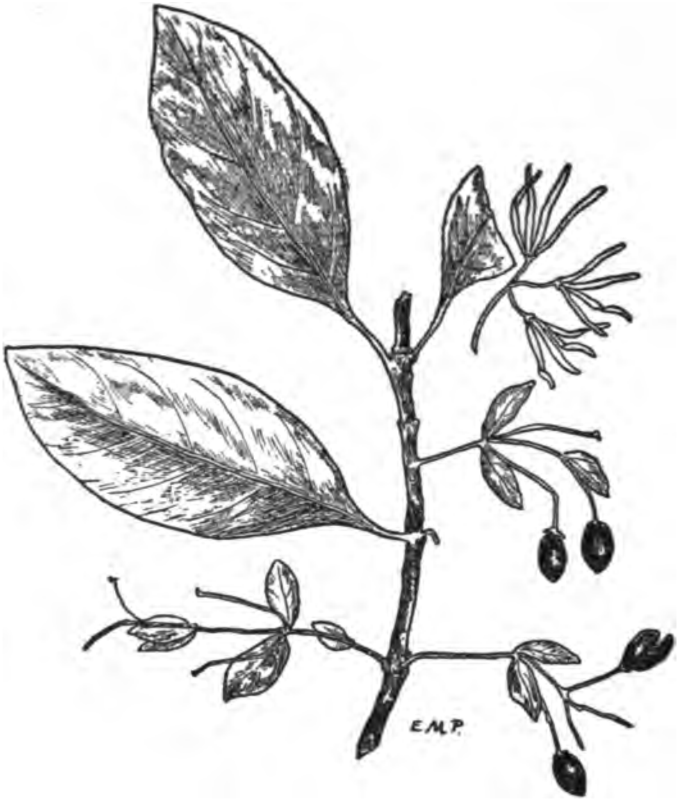

FIG. 188. The Fringe-tree. (*Chionanthus Virginica*), reduced one-half. Original.

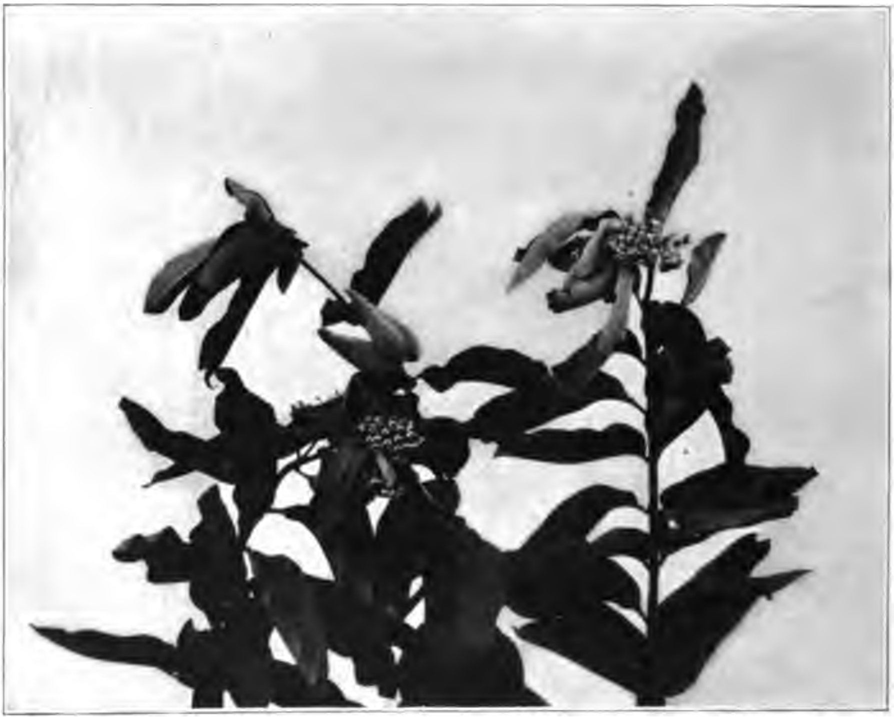

Fig. 192. The Common Milkweed (*Asclepias Syriaca*).
After photograph by Carl Krebs.

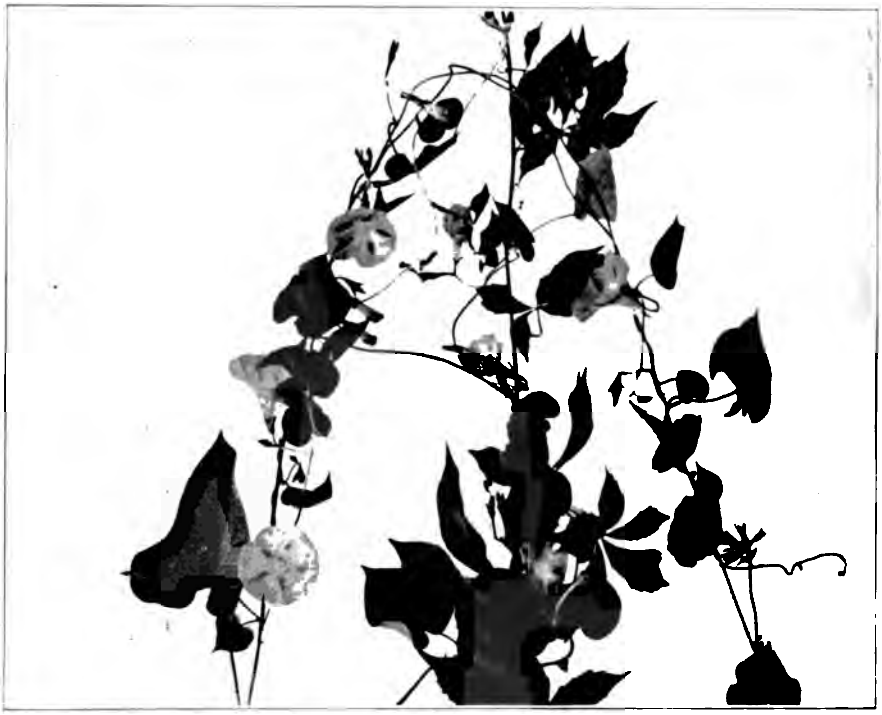

Fig. 194. The Common Morning-glory (*Ipomoea purpurea*).
After photograph by Carl Krebs.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXX.—*Order Gentianales, Continued.*

FAMILY SALVADORACEAE. A group of small trees belonging to five or six species, all comprised in the genus *Salvadora.* They resemble the Oleaceae in most particulars, having opposite leaves, and small panicled flowers with a 4-cleft calyx and corolla, 4-parted stamens and a 1-celled ovary. They are natives of northern and central Africa and southwestern Asia.

Salvadora Indica is supposed to be the plant referred to as mustard in the New Testament, and which, as St. Matthew says, "is the least of all seeds; but when it is grown it is the greatest among herbs, and becometh a tree, so that the birds of the air come and lodge in the branches thereof." As the fruit is pungent and mustard-like, there seems be some ground for the belief.

Family Loganiaceae. Logania Family. Contains about 30 genera and 400 species, widely distributed in warm and tropical regions. They are herbs, shrubs, vines, or occasionally trees, with opposite stipulate leaves, and regular 4–5-parted flowers, the ovary free from the calyx and 2-celled. The stamens are borne on the throat of the corolla and are equal in number to its lobes. Fruit a 2-valved capsule, or a berry. The plants of this family all possess bitter and poisonous properties. Strychnine, one of the most deadly of vegetable alkaloid poisons, is derived from *Strychnos Nux-vomica,* an East Indian tree, while the poison known as wourali, used by natives of Guiana for poisoning their arrow tips, is obtained from *S. toxifera.* Strangely enough, the pulp surrounding the seeds in many species of *Strychnos* is edible, and it is only the seeds themselves that are so highly poisonous (Fig. 189).

In our country the Loganiaceae are represented chiefly by the beautiful climbing shrub known as the southern yellow jessamine (*Gelsemium sempervirens*). The bright yellow flowers of this constitute one of the most prominent features in the spring landscape of our southern States. There are also a number of insignificant weeds belonging to the family.

Family Gentianaceae. Gentian Family. Distinguished from the preceding by the entire absence of stipules to the leaves, and the single-

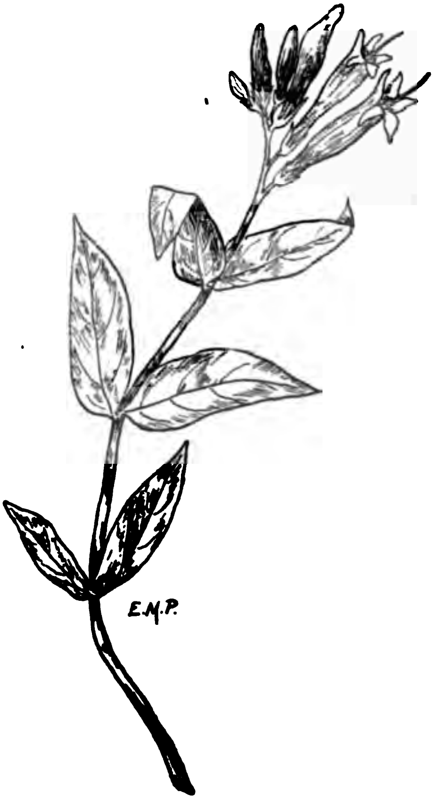

Fig. 189. The Paintroot (*Spigelia Marylandica*) one-half natural size. Original.

celled, instead of 2-celled, ovary. There are about 65 genera and 600 species in this family, and they are very widely distributed. The plants are mostly glabrous herbs, possessing bitter properties, many of them valuable in the pharmacopoeia. The corolla is frequently persistent after withering; it is succeeded by a 2-valved capsule.

The genus *Gentiana* embraces a large number of species, differing widely in habit and in the color of their flowers. Many of them are natives of alpine or mountainous regions, with flowers of great size and beauty in proportion to the size of the plant. In the United States, two of the most beautiful species are the western fringed gentian (*G. elegans* Greene) and the pine-barren gentian (*G. Porphyrio*), the latter being particularly abundant throughout southern New Jersey (Fig. 190). In the southern States the gentians are mostly replaced by species of *Sabbatia*, which have pretty white or pink flowers.

Family Menyanthaceae. Buckbean Family. These are perennial or marsh herbs, formerly included in the Gentianaceae, but now sepa-

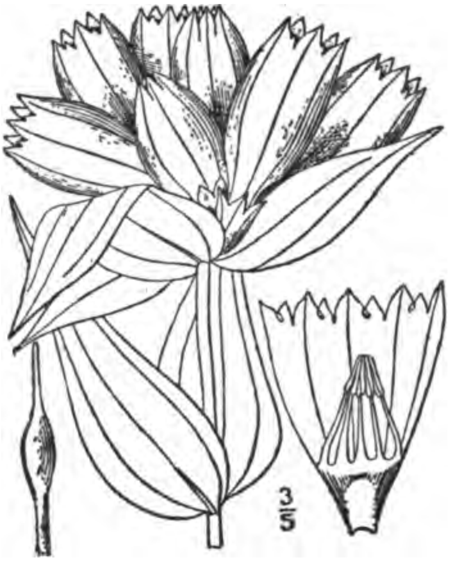

FIG. 190. The Yellow Gentian (*Gentiana flavida* Gray). After Britton and Brown, Ill. Fl. Northeast. U. S.

rated from that family on account of their habit, their basal or alternate leaves, and the different position of the corolla-segments in the bud. There are 5 genera and about 35 species, widely distributed. The buckbean (*Menyanthes trifoliata*) is a familiar denizen of our northern bogs; it has a rather handsome spike of white flowers. *Limnanthemum* includes a number of floating aquatics with leaves somewhat suggesting those of the water lily, and white or yellow flowers. *L. nymphaeoides*, of Europe, is occasionally cultivated for ornament.

Family Apocynaceae. Dogbane Family. Consists of herbs shrubs, or in some tropical genera, trees, with an acrid and usually poisonous milky juice. The leaves are simple, and the flowers regular and 5-parted, the corolla often twisted, a fact which led Linnaeus to give the name Contortae to the group. The stamens are equal in number to the corolla-lobes, and inserted on the throat alternating with them; the ovary is superior, 1-celled or with two distinct carpels; the fruit consists of two follicles, resembling those of milkweeds, or drupaceous. There are about 130 genera and 1,050 species in this widely distributed family. It is most abundantly represented, however, in tropical regions. The dogbanes are an important group, whether considered from the economic or other standpoint. As has been stated, their juice is ordinarily very poisonous; but in some instances it has medicinal value, while in a few genera (*Vahea* and allies) it yields a fair quality of caoutchouc. A number of important fiber plants are also contained in the family; and in a

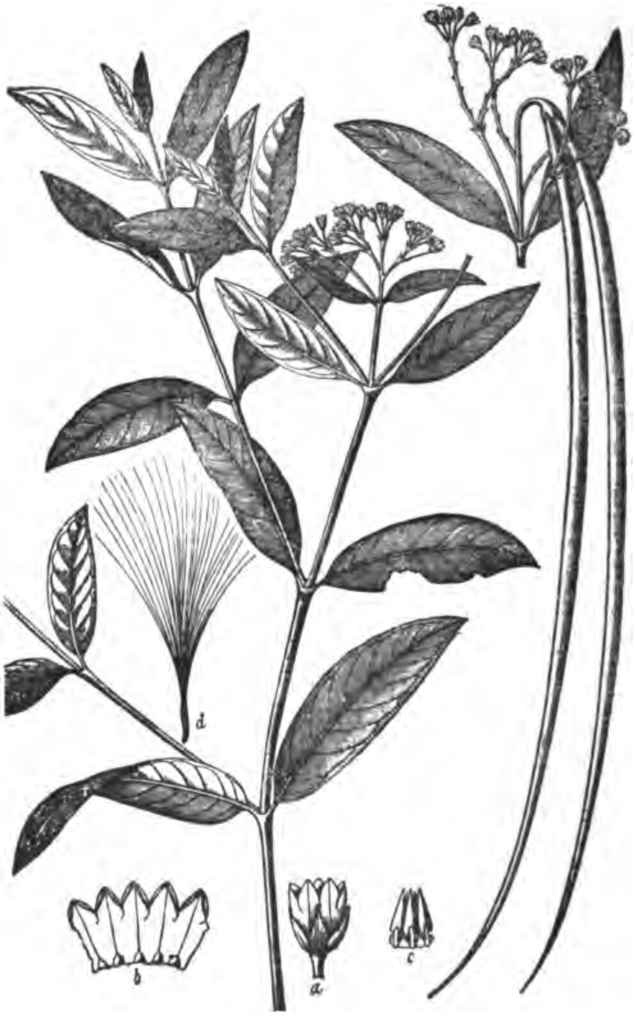

FIG. 191. The Indian Hemp or Dogbane (*Apocynum cannabinum*).
(After Dodge, Rep't. No. 9, U. S. Dept. of Agric)

few instances the fruits are edible. Many climbing shrubs, like *Allamanda* and *Echites*, have handsome flowers, and are familiar in greenhouse cultivation.

The principal representative in our territory is the genus *Apocynum*, known as dogbane. It has rather attractive small pink flowers, succeeded by long narrow fruits with winged seeds. *A. cannabinum*, one of the plants called Indian hemp, furnishes a good tough fiber (Fig. 191).

Several very poisonous trees of the Apocynaceae are of interest as being " ordeal trees." The most familiar of these is the tanghin, *Tanghinia venenifera,* confined to Madagascar. The natives use the seeds in the trials of evil-doers, forcing each culprit to swallow a portion. In case the seed is retained in the stomach it proves immediately fatal, and guilt is then considered established. If on the other hand it is vomited, recovery usually ensues, and the prisoner is released as innocent. In Polynesia *Cerbera* is used in a similar manner.

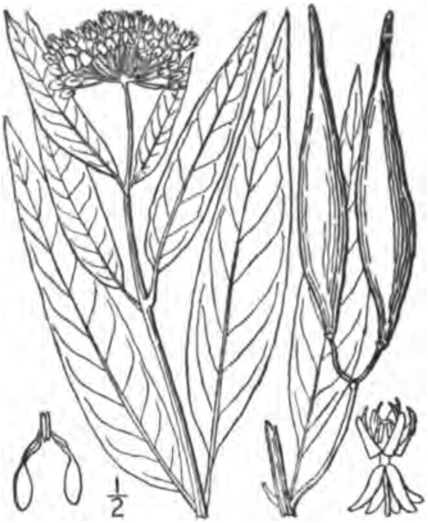

FIG. 193. The Swamp Milkweed (*Asclepias incarnata*). After Britton and Brown, Ill. Fl., Northeast, U. S.

Family Asclepiadaceae. Milkweed Family. Contains about 220 genera and 1,900 species, of wide distribution. They are herbs, vines or shrubs, with milky juice, and flowers borne usually in umbels. The corolla and calyx are 5-parted; between the corolla and stamens is a 5-parted body, known as a crown or corona. The pollen is coherent in masses, as in the orchids, and exhibits many interesting adaptations to cross-fertilization through insect agency. The ovary consists of two carpels, which become follicles in fruit; the seeds are usually appendaged with a long tuft of hair or coma. The milkweeds proper (*Asclepias*) are among our most showy wild flowers; the different species exhibit orange, yellow, pink, purple and white flowers (Figs. 192 and 193). In the desert regions of northern Africa there are a number of leafless succulent plants belonging to this family; these, with *Euphorbias* of similar habit, replace the cacti of our western plains. The juice is often poisonous, like that of the dogbanes, but in some cases it possesses valuable emetic and purgative properties. The family is very widely distributed, but is particularly abundant in South Africa.

CHAPTER XXXI.—*Order Polemoniales or Tubiflorae.*

This order consists mainly of herbs. It embraces twenty families, of which the most important are the Convolvulaceae, Polemoniaceae, Hydrophyllaceae, Boraginaceae, Verbenaceae, Labiatae, Solanaceae, Scrophulariaceae, Bignoniaceae and Acanthaceae. The corolla is gamopetalous throughout, with the stamens more or less united with its tube. The ovary is superior and compound.

Family Convolvulaceae. Morning-glory Family. Contains about 40 genera and nearly 1,000 species, of wide distribution. They are herbs or vines, rarely shrubs or trees, with alternate leaves and axillary flowers. The calyx is usually persistent, the 5-angled or 5-lobed corolla convolute (twisted) in the bud. Stamens, 5; ovary, 2-3-celled, becoming a 2-4-valved capsule.

The two most important genera, *Convolvulus* and *Ipomoea* are highly esteemed as furnishing many ornamental vines. In fact, there is probably no genus in which the species are more uniformly handsome-flowered throughout than the *Ipomoea*, to which the common morning-glory belongs. (Fig. 194). The leaves are of every conceivable shape and degree of lobation, while the flowers exhibit a great variety of colors, particularly in the tropics. The beautiful white moonflower, formerly included in *Ipomoea*, is now usually placed in a distinct genus (*Calonyction*). The Convolvulaceae are of very slight economic importance; the gum-resin known as scammony, is produced by *Convolvulus Scammonia*, while the purgative drug jalap is yielded by a species of *Ipomoea*.

Family Cuscutaceae. Dodder Family. These are leafless parasitic twining vines, all comprised in the single genus *Cuscuta*, of which there are about 100 species, of wide distribution. The calyx and corolla are 5-lobed or 5-parted, the coralla-lobes frequently bearing scales alternate with them. The stamens are 5; ovary 2-celled, becoming a 1-4-seeded capsule.

The seeds of the dodder germinate in the ground like those of ordinary plants, and the young seedling soon attaches itself by means of numerous minute suckers to the adjacent herbage. When it has obtained a sufficient hold to enable it to secure the required amount of nutrition its root and lower portion perish. When fully grown it resembles a mass of white or orange-colored tangled threads spread over the foliage of the herbs on which it is found. While some species, like *C. Gronovii*, are quite cosmopolitan in their tastes, occurring on a variety of plants, others, like *C. Trifolii*, are confined strictly to one kind of plant.

Family Polemoniaceae. Polemonium Family. This group, consisting entirely of herbs, includes about 10 genera and 200 species, by far the most of which are found in the western United States. They have clustered, usually handsome, flowers, the calyx and corolla 5-cleft or 5-parted, the lobes twisted or contorted. Stamens 5, the anthers versatile (attached by the middle); ovary 3-celled, with 3 stigmas, becoming in fruit a 3-valved capsule. The seeds are peculiar, in some cases being winged, and in others enveloped in mucilage and having the property of emitting spiral tubes when wetted.

This family includes the large genus *Phlox*, which affords so many ornamental annuals and perennials to our flower beds; scarcely less pleasing are the *Gilias*, of which there is an enormous number of species in California. *Polemonium* is represented most abundantly in Alaska and the Rocky Mountains, but there are one or two eastern species (Fig. 195). Another familiar garden plant is the exotic climbing vine, *Cobœa scandens*. The Polemoniums, as a rule, possess medicinal properties.

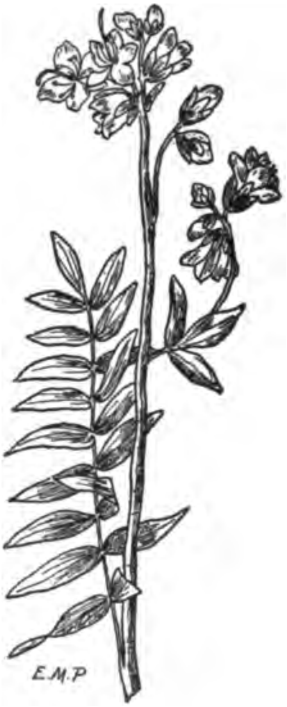

Fig. 195. Eastern Polemonium, or Jacob's Ladder (*Polemonium Vanbruntiae*). One-half natural size. Original.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXX.—*Continued.*

FAMILY HYDROPHYLLACEAE. Waterleaf Family. Contains about 17 genera and 160 species, very widely distributed. The plants are herbs, with variously shaped and usually alternate leaves. The flowers, which are nearly always blue in color, are arranged in one-sided spikes or racemes called *scorpioid* from the fact that they are curved like a scorpion's tail, gradually straightening as the flowers bloom. The calyx and corolla are 5-parted or 5-cleft, the stamens of like number and inserted on the throat of the corolla, alternating with its lobes. Ovary superior, 2-celled with 2 styles; fruit capsular, 2-valved.

The name Waterleaf, which is a literal translation of the name of the typical genus (*Hydrophyllum*) is supposed to refer to the water cavity in each leaf. (Fig. 196.) The Hydrophyllums are common plants in

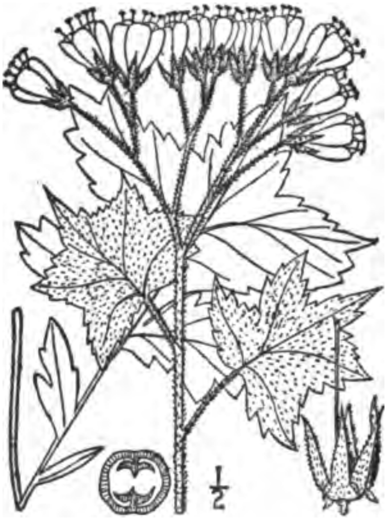

Fig. 196. The Waterleaf (*Hydrophyllum appendiculatum*). After Britton and Brown, Ill. Fl. Northeast U. S.

rich woods; they have large pinnatifid or pinnate leaves and white or blue, rather large flowers. The genus *Phacelia* embraces about half the species in the family, the majority of them occurring in the western half of the United States. They are hairy herbs, with blue, purple or white flowers in terminal clusters. In some of the species the corolla is beautifully fringed. *Nemophila*, a genus mainly of Californian distribution, contains species that are in common cultivation as garden annuals.

Family Boraginaceae. Borage Family. This large group differs from the preceding chiefly in the structure of the fruit. The ovary consists of two distinct carpels, each of which are 2-celled, but they are often lobed so as to appear 1-celled. The fruit consists, therefore, of 2 or 4 one-seeded nutlets. The plants are herbs, shrubs, or in some tropical genera trees, comprised in 85 genera and 1500 species, very widely distributed, though most abundant in temperate latitudes. In the tropics, with the exception of a few kinds of heliotrope (*Heliotropium*), the family is represented only by trees and shrubs of the genera *Cordia*, *Tourne-*

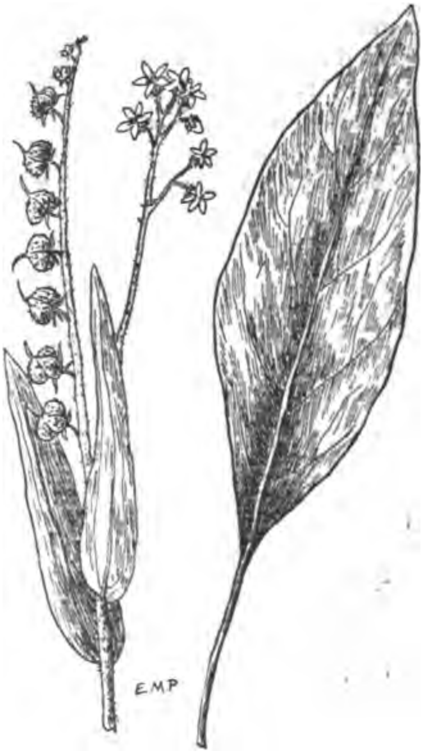

Fig. 197. The Houndstongue (*Cynoglossum officinale*). Original: reduced one-half.

fortia, and a few relatives of these. Our western plains and the drier regions of southern Europe and Asia, on the other hand, abound with bristly-hairy herbs of the Borage family. In general, they possess mucilaginous qualities, and quite a number yield dyes, as the alkanet (*Alkanna tinctoria*). A few are occasionally used as potherbs, like the comfrey (*Symphytum officinale*) or as salads (*Borago officinalis*). Very few can be considered ornamental, with the exception of the heliotropes and some species of *Myosotis* (forget-me-not). Some of the European genera, such as the blueweed (*Echium vulgare*) have become extremely troublesome weeds in certain parts of our eastern States. The seeds of many of these plants are curious, being very hard and stone-like in texture, (whence the name *Lithospermum*, applied to one genus,) and often polished white and shining. Fig. 197 shows the fruit of the common houndstongue (*Cynoglossum officinale*) which belongs to the class of "stick-tights," being beset with viscid bristles. Fig. 198 is a flowering branch of the tree *Cordia alba*, commonly cultivated for ornament in the West Indies.

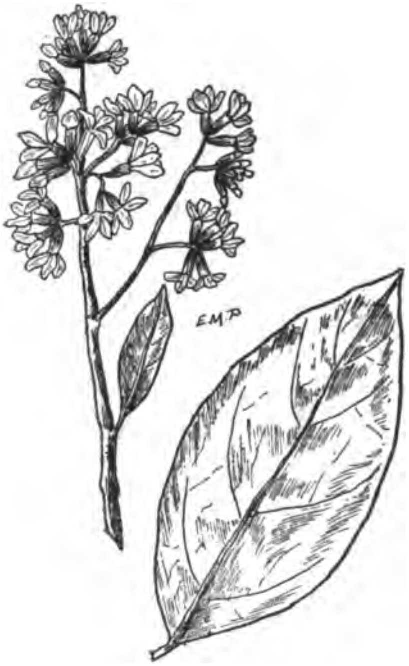

FIG. 198, White Cordia (*Cordia alba*). Original; reduced one-half.

Family Verbenaceae. Verbena Family. These are herbs, shrubs, or occasionally trees, comprised in about 70 genera and 1200 species of wide distribution. They have opposite or whorled, rarely alternate leaves, and perfect but usually irregular flowers, variously clustered. Calyx 4–5-lobed. Corolla bilabiate (2-lipped) or sometimes regular,* with a slender tube and 4–5-cleft upper portion. Stamens 4, one pair longer than the others, or rarely 2; ovary superior, 2–4-celled, composed of 2 carpels; fruit dry, consisting of 2–4 nutlets, or fleshy, a 2–4-seeded drupe.

The verbena of our gardens, belonging to the genus *Verbena*, is a characteristic plant of this family. Besides the ornamental species of cultivation having the corolla of many colors, there are many wild species of *Verbena*, known as vervains, which are decidedly weeds, having small, insignificant flowers in long spikes. (See Fig. 199.) *Lippia* is somewhat similar in its characters to *Vevbena;* it is very widely represented in the tropics, as is also *Lantana*, familiar to us as a greenhouse shrub. The black mangrove (*Avicennia nitida*), common on the Florida Keys, and remarkable for its habit of sending up from the ground short erect roots, is a tree of this family. The so-called "lemon verbena" belongs to the genus *Aloysia*. The teakwood of East India (*Tectona grandis*) is one of the most important Oriental timber trees. Other East Indian genera, sometimes represented in cultivation, are *Vitex* and *Clerodendron*.

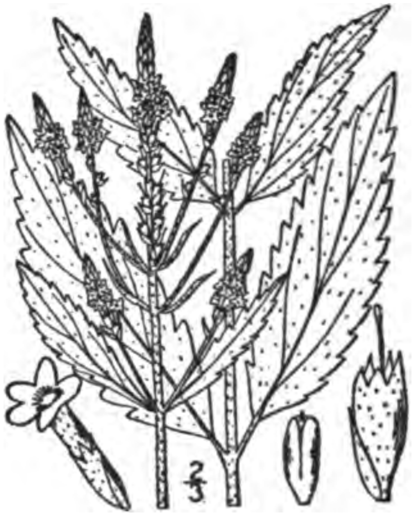

FIG. 199. The Blue Vervain (*Verbena hastata*). After Britton and Brown, Ill. Fl. Northeast U. S.

Family Labiatae. Mint Family. This very large and important

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*The flat, expanded part of a corolla like that in a phlox flower, is known as the *limb* in contra distinction to the *tube* below.

group consists of about 160 genera and 3000 species, of very wide distribution. They are herbs or shrubs, rarely trees, with highly aromatic herbage, and may be recognized usually by the square stems and opposite leaves. The calyx is 5-toothed or 5-lobed, mostly nerved; the corolla with a 4–5-lobed limb, but mostly bilabiate. Stamens 4, in two sets, or 2. Ovary superior, 4-lobed, becoming in fruit 4 one-seeded nutlets, one of the important characters of the family.

The Labiatae include all of our familiar wild and garden mints, such as balm, savory, sweet basil, sweet marjory, thyme, hyssop, lavender, pennyroyal, bergamot and the like. While the majority of the mints used for economic and officinal purposes are of Old World origin, we have many genera and species in the United States. There is space merely to mention a few of the more important forms. *Mentha* (See Fig. 200) is the type of the family, and furnishes us with peppermint (*M. piperita*) and spearmint (*M. spicata*). The flowers are in close whorls at the axils of the leaves, or are aggregated in a terminal spike. *Monarda* contains some very handsome species, notably *M. didyma*, the bee balm, with scarlet flowers; *M. fistulosa*, the wild bergamot (See Fig. 201) with pink or purple flowers, and *M. punctata*, the horse balm, with yellowish, spotted flowers. The very large genus *Salvia*, or sage, chiefly tropical in distribution, furnishes us with common sage, valuable in seasoning, and with the splendid scarlet-flowered species that give color to our flower beds in the late summer. *Coleus*, well-known as an ornamental foliage

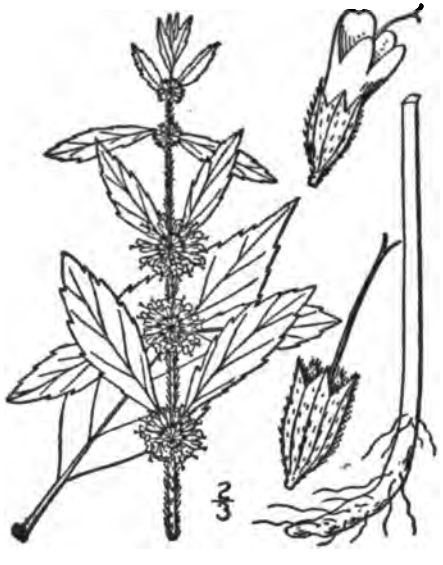

FIG. 200. American Wild Mint (*Mentha Canadensis*). After Britton and Brown, Ill. Fl. Northeast U. S.

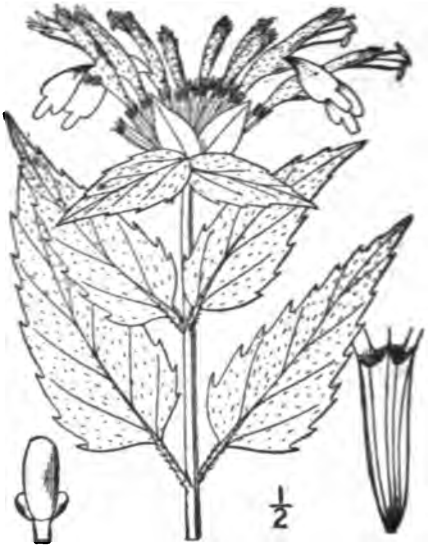

FIG. 201. The Wild Bergamot (*Monarda fistulosa*). After Britton and Brown, Ill. Fl. Northeast U. S.

plant, belongs with the mints, as does also the little ground ivy (*Glecoma*). The Pacific Coast has a number of ornamental species in *Ramona*, *Stachys* and *Monardella*. The largest flowered of our eastern mints are found in *Physostegia*, the false dragon-head. The general type of labiate flower is shown in Fig. 202.

Family Nolanaceae. Nolana Family. Consists of about 40 species, comprised in the single genus *Nolana*, which was formerly included in the Solanaceae. They are South American herbs or undershrubs, with rather pretty flowers, very similar in structure to the nightshades.

Family Solanaceae. Nightshade Family. Includes about 70 genera and 1600 species, most abundant in the tropics. They are herbs, shrubs or vines, or rarely trees, with usually alternate leaves and cymose flowers. The calyx and corolla are 5-lobed, the latter with the lobes plicate (folded) in the bud. Stamens as many as the lobes of the corolla and alternate with them, all equal except in one genus. Ovary superior, 2-celled, becoming in fruit a berry or a capsule with numerous seeds.

The family, as a whole, possesses strongly narcotic and poisonous properties. These are particularly prominent in *Atropa*, which yields the drug belladonna; in *Hyoscyamus*, the henbane; and in many species of *Solanum* or nightshade. The latter is the largest genus of the family, containing fully 900 species, exhibiting a wide variety of form and uses. The most important from the economic standpoint is the potato (*Solanum tuberosum*), the tubers of which lose their poisonous principle by

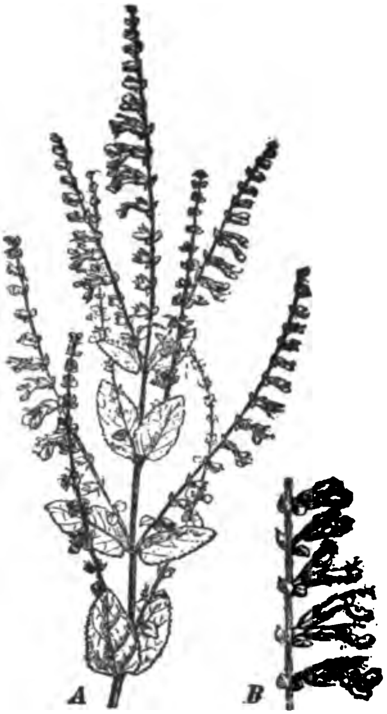

FIG. 202. Flowering branch and enlarged flowers of a typical labiate plant (*Teucrium*). After Coulter's "Plant Structures," by courtesy of D. Appleton & Co.

cooking, and become one of our most nutritious vegetables. In Japan the fruits of *S. album* and *S. Aethiopicum* are used as food, and in South America and Australia, other species are employed for the same purpose. Several species, such as *S. indigoferum*, are cultivated for the sake of the dyes which they yield. Many of the nightshades are disagreeable weeds, particularly in warm latitudes; in this category may be mentioned the horse-nettle (*S. Carolinense*) and the black nightshade (*S. nigrum*). A few species, as *S. Seaforthianum*, are cultivated for their flowers.

The tomato belongs to the allied genus *Lycopersicum*, and has been wonderfully developed in the hands of horticulturists. The ground-cherry or ground-tomato, belongs to the rather large genus *Physalis*.

A number of ornamental plants, such as the *Petunia*, the *Datura* and species of *Cestrum* belong to the family. *Datura* includes also the familiar "jimson-weed" of our southern States (see Fig 203); though

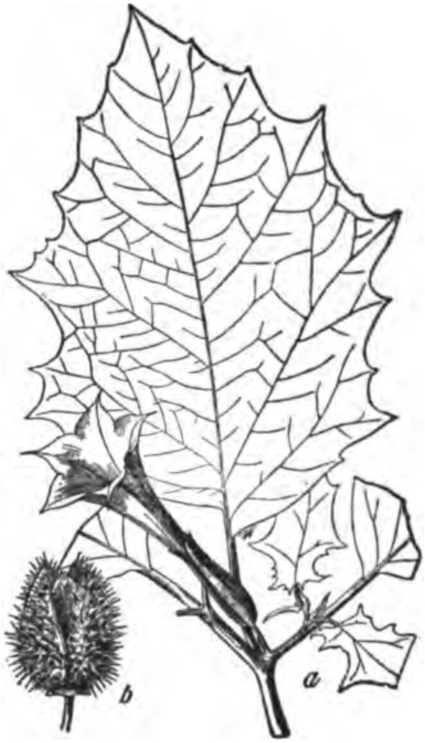

Fig. 208. Jimson-weed (*Datura Stramonium*): a. flower and leaf; b, fruit; both one-third natural sizes. (After Chesnut, Bull. No. 20, Div. of Bot. U. S. Dep't of Agric.)

certainly a troublesome weed, it is not altogether without its uses, as the leaves enter into nearly all preparations for the cure of asthma.

Not the least important member of the family is the genus *Nicotiana*, the tobacco. There are a number of wild species, but the tobacco of commerce is chiefly derived from *N. Tabacum*.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXX.—*Continued.*

FAMILY Scrophulariaceae. Figwort Family. These plants are herbs, shrubs or occasionally trees, having perfect but usually somewhat irregular flowers. The calyx is persistent, 4–5-divided, and sometimes irregularly cleft. The corolla is usually 2-lipped; the stamens are 2, 4 or 5, occasionally nearly equal, but more often in two sets of different lengths (didynamous) and inserted on the corolla. Pistil entire or 2-lobed; ovary superior, 2-celled or rarely 1-celled, becoming in fruit a capsule with numerous seeds. The family contains about 165 genera and 2500 species of very wide distribution.

Although very close in appearance and structure to some of the related families, the figworts can be distinguished, technically, by their albuminous seeds. One tribe is indeed so close to the nightshades that it can only be separated by a finely drawn arbitrary line. By some writers the family has been divided into groups according to the arrangement of the corolla-lobes in the bud. Thus the Salpiglossideae, containing the showy garden plants of the genera *Salpiglossis*, *Browallia* and *Schizanthus*, has the corolla plaited, with the two upper lobes outside. Another large group contains the snapdragons and their allies, and is distinguished by having a 2-lipped corolla bearing a fancied resemblance to the human face in some of the genera, such as *Antirrhinum*, the garden snapdragon, and *Linaria*, which includes the wild toadflax or "butter-and-eggs." The corolla of the latter bears in addition a long spur. This tribe is a very large one, containing many highly ornamental herbs. Such genera as *Pentstemon* and *Mimulus*, countless species of which grow wild in our Western States, exhibit many horticultural varieties, with flowers of showy coloration (See Fig. 204). The familiar mullein (*Verbascum*), of which there are numerous European species, is perhaps the only common weed of this group.

The next group has the corolla imbricate in the bud and the upper two lobes always inside, and it is scarcely at all bilabiate. Here we find the genus *Gerardia*, whose attractive pink and white flowers are conspicu-

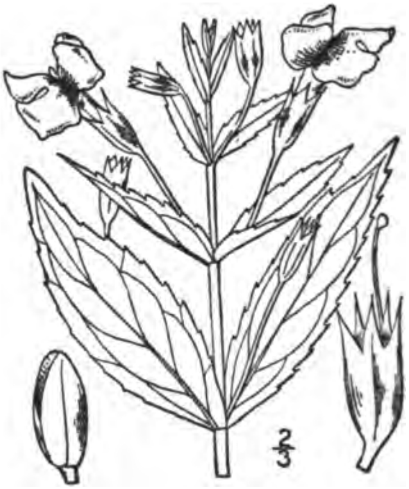

FIG. 204. Monkey-Flower (*Mimulus ringens*). After Britton and Brown, Ill. Fl. Northeast U. S.

ous features of the fall landscape, particularly in rather dry situations. The false foxglove (*Dasystoma*) was formerly included in the genus *Gerardia*, but is distinguished by its yellow flowers. There are several peculiar features about the Gerardias and their allies. In the first place they are all partial root parasites, deriving a portion of their sustenance from the roots of other plants, a fact that renders it difficult to transplant them. In addition they have the singular property of turning completely black during the ordinary process of drying.

Another large genus of the same group is *Veronica*, which includes the common speedwells, low herbs with flowers of different colors, some found as weeds in the lawn and meadow, others growing along brook sides, whence they are called "brooklime". The louseworts (*Pedicularis*) are most abundant in arctic and alpine regions. They have a peculiarly shaped corolla known as galeate, from the resemblance of its upper lobe to a helmet. (See Fig. 205.)

A number of the plants belonging to the Scrophulariaceae possess strongly marked medicinal properties. Thus the European foxglove (*Digitalis*) contains an intensely poisonous alkaloid called digitalin, but in small doses it is a valuable heart stimulant. The genus *Scrophularia*, type of the family, derives its name from the property which the roots were supposed to possess for curing scrofula. *Euphrasia*, a large Old World genus, is known as eye-bright, from its use, both externally and internally, in complaints of the eyes.

Mention has already been made of most of the ornamental genera, but the handsome tree *Paulownia imperialis* should not be overlooked.

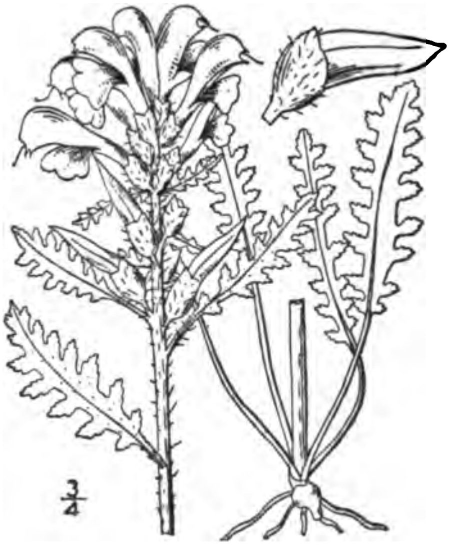

FIG. 205. Wild Lousewort or Wood Betony (*Pedicularis Canadensis*). After Britton and Brown, Ill. Fl. Northeast U. S.

This is the only Scrophulariaceous tree seen in temperate climates; it bears large pyramidal clusters of lilac-purple flowers, succeeded by ovoid capsules which are persistent on the tree through the winter. It is commonly planted in our parks, and escaped in many places. It is a native of China and Japan.

Family Bignoniaceae. Bignonia Family. Consists of climbing shrubs or trees, with usually opposite compound leaves and showy flowers. Calyx 4–5-toothed, sometimes completely cleft on one side, forming a sort of spathe. Corolla 4–5-lobed, somewhat irregular. Stamens 5, unequal, one or two generally abortive. Ovary 2-celled, becoming in fruit a 2-celled, pod-like capsule; seeds numerous and winged.

There are about 50 genera and 450 species in this family; they are found principally in the tropics of both hemispheres, but predominate in the eastern. In equatorial jungles they constitute a large part of the so-called "lianas," which are flexible, woody vines, whose rope-like stems form loops in all directions, clambering over the tall forest trees and making progress impossible.

There are many genera, like *Bignonia*, whose showy flowers render them desirable for greenhouse cultivation. Two species of *Bignonia* and two of *Tecoma* are found within our borders, in the Southern States. The tropical calabash tree (*Crescentia*) with large, gourd-like fruits, used for dishes and water-bottles, belongs to this family.

Family Pedaliaceae. Sesame Family. This is not a large group, containing only about 10 genera and 25 species. The plants are annual or perennial, with simple leaves and rather large axillary or clustered flowers. The calyx and corolla are each 5-lobed, the latter nearly regular; stamens 4, didynamous, with an abortive or rudimentary fifth one; ovary 1-celled, becoming a rather hard capsular fruit of variable shape. The family is confined to the tropics, being most abundant in Africa. Seeds in most of the genera are decidedly mucilaginous; this is particularly true of sesame (*Sesamum Indicum*) whose seeds, known in the West Indies as "benny seeds," yield a fixed oil, and are much used in making cakes and confectionery; the oil is also used as an adulterant for olive and almond oil.

Family Martyniaceae. Martynia Family. This curious family, consisting of a single genus, with about 12 species, was formerly included in the preceding, from which it is abundantly distinguished by the irregular flowers, and the fruit, which is tipped with two long curved beaks or horns, whence it is sometimes called the unicorn plant. The species are all tropical American, and one occurs as an escape as far north as New York City. Several species are in garden cultivation, both for their interesting flowers, and for the young fruit, from which very good pickles can be made.

Family Orobanchaecae. Broom Rape Family. Contains about 11 genera and 200 species, of wide distribution. They are all root parasites, practically leafless, the leaves being reduced to small appressed scales; the flowers are perfect and irregular, either solitary or in terminal spikes. Calyx 4-5-toothed, or cleft on one or both sides. Corolla 5-lobed, 2-lipped. Stamens 4, didynamous, with the rudiment of a fifth present. Ovary 1-celled, becoming a 2-valved capsule with numerous seeds.

The broom-rapes startle us by the ghostly spontaneity with which they spring up in unexpected places. They are usually of one color throughout, and the effect is sometimes rather pleasing. Thus the small naked broom-rape (*Thalesia uniflora*) has a solitary long-peduncled flower, and is pale lilac throughout. It grows rather abundantly in the spring in moist woods. Squaw-root (*Conopholis*), on the other hand, is found in dense tufts at the bases of trees; it has the yellowish flowers in stiff spikes. Plants of this family possess tonic and astringent properties, and have occasionally been used in medicine.

Family Gesneraceae. Gloxinia Family. About 100 genera and 800 species, natives exclusively of the tropics, and particularly abundant in South America. They are herbs or shrubs, frequently with tuberous roots; the wrinkled leaves are opposite, and the flowers are nearly always showy. Calyx 5-parted; corolla 5-lobed, somewhat irregular;

stamens 2 or 4, the anthers sometimes united. Ovary 1-celled, surrounded by glands at the base. Fruit 1-celled, dry or succulent.

The chief interest attaching to this family lies in their value as ornamental plants for the greenhouse, most of them, such as *Gloxinia*, *Gesnera*, *Achimenes*, etc., take kindly to cultivation and many beautiful varieties have been developed from the original species.

Family Columelliaceae. Columellia Family. Consists only of the genus *Columellia*, with several Peruvian species. They are evergreen shrubs related to the Gesneraceae, but the flowers are remarkable in having the two anthers with enormously elongated cells, which coil upon themselves and form a globular mass.

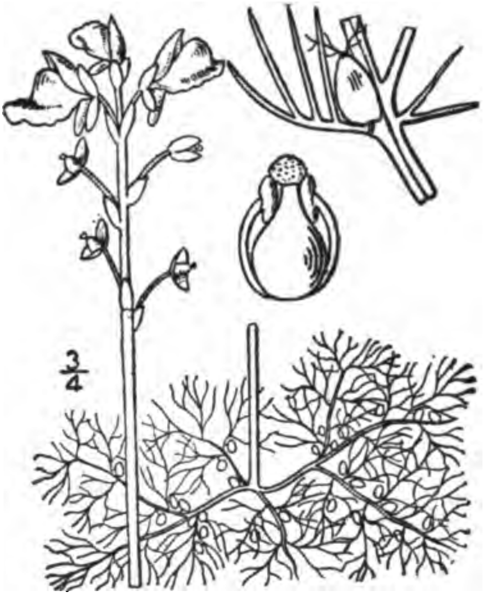

FIG. 206. Greater Bladderwort (*Utricularia vulgaris*). After Britton and Brown, Ill. Fl. Northeast U. S.

Family Lentibulariaceae. Bladderwort Family. These are marsh terrestrial or aquatic herbs, with perfect irregular flowers having a 2–5-parted calyx, and a 2-lipped corolla, the upper lip 2-lobed, the lower 3-lobed and spurred. Stamens 2; ovary 1-celled, capsular in fruit. There are 4 genera and about 180 species; the two important genera are *Utricularia* and *Pinguicula*. The former comprises the three bladderworts, most of which are immersed or floating aquatics with finely cut foliage, supported by small inflated bladders, and erect scapes of pink or yellow flowers. (See Fig. 207.) *Pinguicula* is common in the pine barrens of

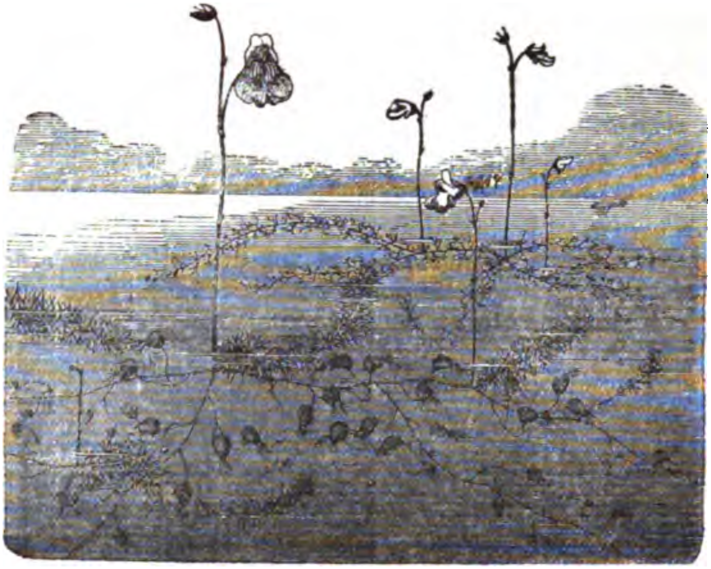

FIG. 207. Another view of the bladderwort (*Utricularia*) showing the air bladders by which the plant is floated. After Kerner, from Coulter's "Plant Relations," by courtesy of D. Appleton & Co.

the south, and the species are found in extreme arctic regions as well; they are called butterworts, from the slippery surface of the leaves, which are borne in a basal tuft or rosette.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXX.—*Continued.*

FAMILY GLOBULARIACEAE. Globularia Family. A small group of herbaceous or shrubby plants, natives of both shores of the Mediterranean, having flowers borne in a head and surrounded by an involucre, a character from which the name of the principal genus is derived. The calyx is 5-parted; the corolla tubular, 5-lobed and somewhat 2-lipped; stamens, 4. Ovary free, one-celled, becoming in fruit an achene, closely invested by the persistent fruiting calyx. There are 3 genera, *Globularia*, with 17 species, *Lytanthus*, with 2, and *Cockburnia*, with 1.

Family Acanthaceae. Acanthus Family. Herbs, shrubs, or rarely trees, with opposite leaves and irregular or nearly regular flowers. Calyx 4–5-parted. Corolla 5-lobed, frequently 2-lipped. Stamens 2 or 4, in the latter case didynamous. Ovary free, 2-celled. Capsule 2-celled, loculicidally 2-valved. The family contains about 175 genera and 1800 species, widely distributed in warm temperate and tropical regions. Many are mere weeds, but some are ornamental plants. The Old World genus *Acanthus* has served for centuries as a pattern for art designs; the leaves of *A. spinosus* are said to have furnished to Callimachus the model for the Corinthian capital in architecture.

Our native plants of this family are few in number. Ruellias, of several species, low herbs with purple flowers, are rather common plants of the late summer. The water-willow (*Dianthera*) grows in large masses on the edges of ponds and streams, its speckled flowers being exceedingly irregular. In the greenhouse we find numerous handsome species of *Justicia* and *Aphelandra*. Most of the Acanthaceae contain a bitter principle, and some few are of value in medicine. (See Fig. 208.)

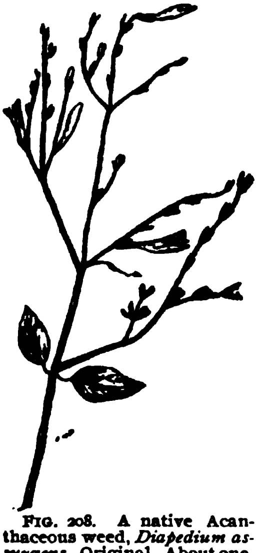

Fig. 208. A native Acanthaceous weed, *Diapedium assurgens*. Original. About one-third natural size.

Family Myoporaceae. Myoporum Family. A group of shrubs, natives chiefly of Australia, comprised in about 5 genera and 80 species. They have a 5-parted, persistent calyx; a more or less 2-lipped corolla; four didynamous stamens, and a 2–4-celled ovary, becoming in fruit a drupe or nutlet. The leaves are often covered with transparent glands.

Family Phrymaceae. Lopseed Family. Consists of a single genus and species, *Phryma leptostachya*, a weed-like herb of the eastern United States and eastern Asia. Though formerly included in the Verbenaceae, it is abundantly distinct from other members of that group. Fig. 209 well represents the peculiar reflexed fruit from which the name "lopseed" is derived. The calyx is cylindrical and 2-lipped; corolla 2-lipped, irregular, stamens 4, didynamous; ovary 1-celled, becoming in fruit a dry achene enclosed by the persistent calyx. The plant is common in open woods and and thickets.

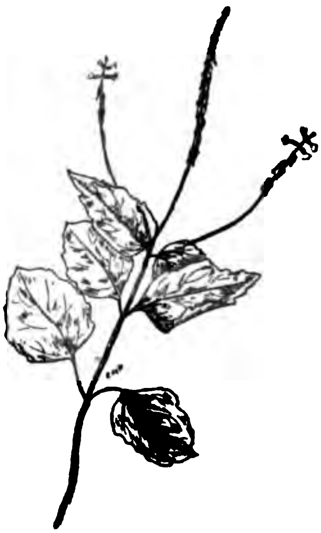

FIG. 209. The Lopseed (*Phryma leptostachya*). One-third natural size. Original.

CHAPTER XXXI.—ORDERS PLANTAGINALES AND RUBIALES.

The order Plantaginales comprises only the following:

Family Plantaginaceae. Plantain Family. Contains 3 genera and over 200 species, of almost world-wide distribution. The plantains are herbs of characteristic appearance, the majority stemless, with a tuft of basal leaves, the inflorescence being in a close erect spike or head, very rarely solitary. The calyx is 4-parted and persistent, corolla dry and membranaceous, 4-lobed. Stamens 4. Ovary superior, 1–2-celled, becoming in fruit a small nutlet or a pyxis. The latter is a thin capsule splitting when ripe in a circular line around the middle.

The common rib-grass (*Plantago lanceolata*) is a troublesome pasture weed, as also *P. major* and *P. media.* All three of these are European species. The seeds of *P. major*, the greater plantain, are frequently used in bird seed mixtures. (See Fig. 210.)

The large order Rubiales contains the families Rubiaceae, Caprifoliaceae, Adoxaceae, Valerianaceae and Dipsacaceae. These agree in the following characters: Stamens as many as the corolla lobes and alternate with them, or twice as many. The ovary is compound and inferior, the tube of the calyx being adnate to it. In all the included families the leaves are either opposite or verticillate.

Family Rubiaceae. Madder Family. This very important and almost entirely tropical group contains about 355 genera and 5500 species of wide distribution. They are herbs, shrubs or trees, with a 4–5-lobed calyx and corolla of varying shape. The ovary is 1–10-celled, becoming in fruit a capsule, berry or drupe. Rubiaceous plants may usually be recognized by the stipules or leaf-like membranes uniting the bases of the opposite or whorled leaves. The family is of great economic importance, containing, as it does, beverage, dye and medicinal plants, not to mention those of ornamental value. In the tribe Cinchoneae, for example, is found the genus *Cinchona,* which consists of evergreen trees growing chiefly in the valleys of the Andes of Peru. Several species yield what is known commercially as Peruvian bark, and it is from this that quinine and the related alkaloids are obtained. These barks have different properties according to the relative proportions of the alkaloid they contain; but in all cases the extract is extremely bitter and possesses prominent tonic qualities.

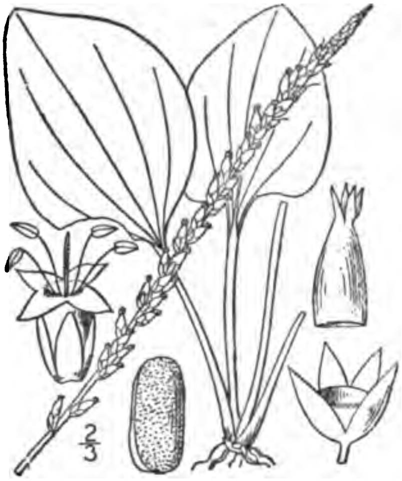

FIG. 210. The Common Plantain (*Plantago major*). After Britton and Brown, Ill. Fl. Northeast U. S.

The same group contains *Bouvardia,* a genus of handsome greenhouse shrubs, one species of which (*B. triphylla*) is native in our south-

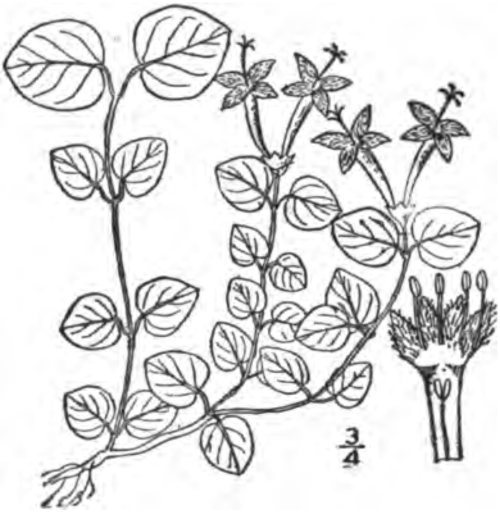

FIG. 211. The Partridge-berry (*Mitchella repens*). After Britton and Brown, Ill. Fl. Northeast U. S.

western States. In the tribe Ixoreae is contained the genus *Coffea*, or coffee, one of the important staples of the tropics. The related genus *Ixora* includes some trees with very hard, tough wood, notably the West Indian ironwood (*Ixora ferrea*).

Our native Rubiaceous plants are limited in the northern states to the partridge-berry, *Mitchella* (Fig. 211), the various species of *Houstonia* or bluets (Fig. 212) and the bedstraws (*Galium*), the latter homely insignificant weeds. (Fig. 213).

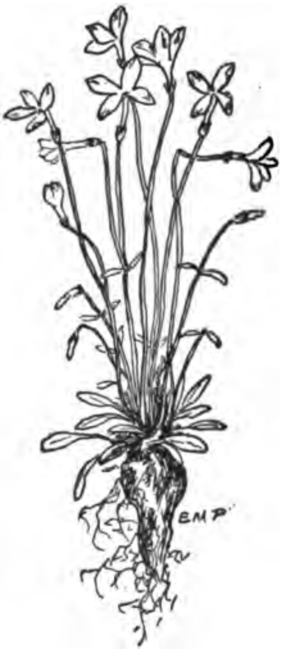

FIG. 212. Bluets (*Houstonia coerulea*). One-half natural size. Original.

Family Caprifoliaceae. Honeysuckle Family. Consist of about 10 genera and and 260 species, mostly of the northern hemisphere. They are shrubs, trees, vines, or even herbs, having opposite leaves ordinarily without stipules, and mostly cymose flowers. Calyx 3–5-toothed. Corolla 5-lobed, occasionally bilabiate. Stamens 5 or 4, borne on the tube of the corolla. Ovary inferior, 1–6-celled, becoming in fruit a berry, drupe or capsule.

The honeysuckles form a very attractive group, most of the genera being ornamental in cultivation. *Lonicera*, which includes all the true honeysuckles, is a genus of shrubby vines, many with evergreen foliage, and all having flowers with great beauty of form and diversity of color; they are also very fragrant. *Viburnum* consists of shrubs and trees, of which the snowball tree is a good example; there are many native species. (Fig. 214.) The dainty little twin-flower of northern regions, *Linnaea borealis*, is another number of this family. In the west occur several species of undershrubs with small bell-shaped flowers and white

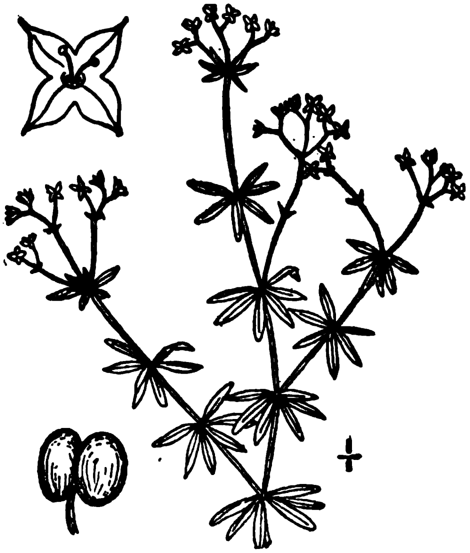

FIG. 213. A native species of Bedstraw (*Galium concinnum*). After Britton and Brown, Ill. Fl. Northeast U. S.

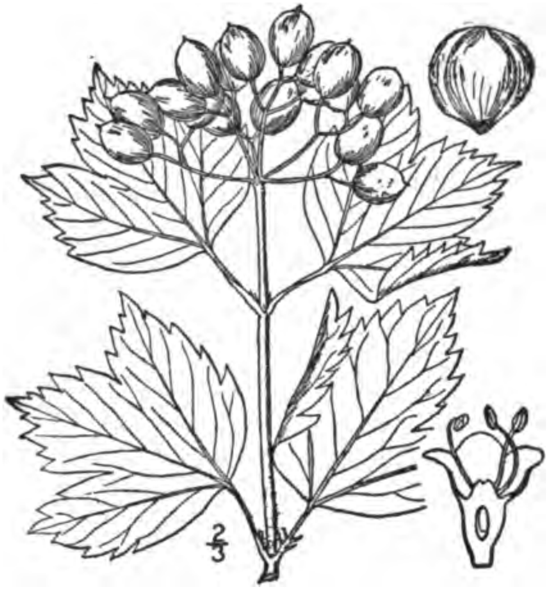

FIG. 214. The Dockmackie (*Viburnum acerifolium*). After Britton and Brown, Ill. Fl. Northeast U. S.

berries. These belong to the genus *Symphoricarpos*. (Fig. 215.) As a general rule, the Caprifoliaceae possess astringent properties. The berries of the elder (*Sambucus*) were often used in early days in making

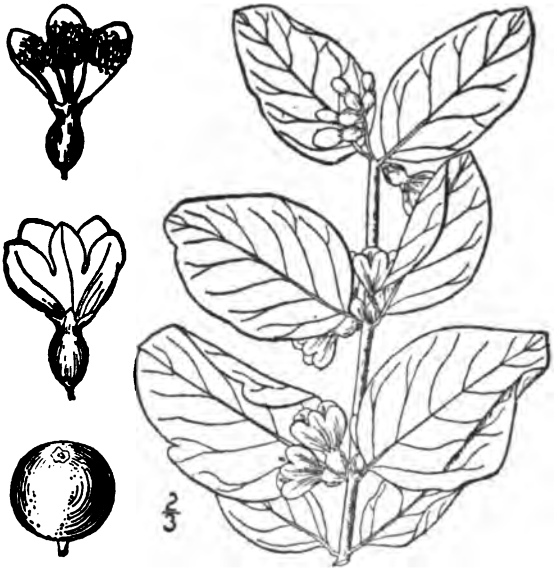

FIG. 215. The Snowberry (*Symphoricarpos racemosus*). After Britton and Brown, Ill. Fl. Northeast U. S.

elderberry wine. In England the Saxons used to hold the elder bush, or "ellhorn," in great awe and reverence. It was supposed to be a sovereign remedy for many diseases, and was also used, like the witch-hazel, as a divining rod.

Family Adoxaceae. Moschatel Family. This consists of a single monotypic genus, the species being *Adoxa Moschatellina*, a slender herb of the northern parts of both hemispheres. It is distinguished from the preceding family by having the stamens twice as many as the corolla lobes, and by its ternately divided leaves.

Family Valerianaceae. Valerian Family. These plants are all herbs, contained in 9 genera and about 275 species of wide distribution. They have opposite leaves without stipules, and small cymose flowers. The distinguishing character of the family is found in the 3-celled ovary, only one cell of which contains an ovule, the others being empty. The fruit is dry and nut-like, one-seeded. *Valeriana*, the valerian, contains the greatest number of species; they are all strong-smelling plants, possessing powerful medicinal properties; none are of much beauty. *Valerianella*, which consists of smallar herbs, is known as corn salad from the fact that several of the species are in cultivation as salad vegetables, particularly in Europe. They possess no distinctive flavor, but are in good condition very early in the season.

Family Dipsacaceae. Teasel Family. Contains about 7 genera and 140 species, natives of the Old World. They are also herbs, with the flowers in close heads subtended by an involucre, like those of the Compositae. The fruit is a small achene, crowned by the persistent calyx. *Dipsacus*, the teasel, has heads of flowers interspersed with rigid spiny points, which in the true fullers' teasel are hooked at the apex; it is thus an invaluable article to the cloth manufacturer, who uses the heads to raise a nap on cloth; no machine has yet been invented that fulfills the same purpose. *Scabiosa*, another large genus of this family, contains a number of species familiar in old gardens under the names of mourning bride and sweet scabious.

The Dipsacaceae and Valerianaceae are held by some authors to constitute a distinct order, the Valerianales.

SUPPLEMENT.

THE FAMILIES OF FLOWERING PLANTS.

By Charles Louis Pollard.

CHAPTER XXXII.—*Order Campanulales.*

THIS order includes the highest types of flowering plants, and consists of the following families: Cucurbitaceae, Campanulaceae, Cichoriaceae, Ambrosiaceae and Compositae. It is distinguished by having the anthers, with very few exceptions, united into a ring. In the two first-named families, the flowers are distinct and separate, but in the last three they are united into a close head, which is subtended by one or more whorls of leaves resembling a calyx, and known technically as an *involucre.* Any of our familiar wayside composites, like the daisy or dandelion, will afford good illustrations of this, the so-called flower consisting of many minute flowerets, each with its own specialized parts.

Family Cucurbitaceae. Gourd Family. These plants are all herbaceous vines, climbing by means of tendrils. The leaves are alternate, and usually palmately lobed or divided. The flowers are monoecious or occasionally dioecious, the male flowers larger and more conspicuous. Calyx adherent to the ovary. Corolla gamopetalous, or sometimes of 5 separate petals. Stamens 3 or 1, irregular. Ovary 1–3-celled, becoming what is known as a pepo, a fruit with a fleshy exocarp and a spongy endocarp filled with numerous seeds, familiar to us in the squash, pumpkin, melon, cucumber and watermelon, all of which are important members of this family. The fruits of many exotic species are highly ornamental, being of odd shapes and frequently of variegated colors. In some few cases, such as "dish-cloth" gourd *(Luffa)*, the fruit is dry and fibrous instead of being fleshy. Fig. 216 shows the habit of a cucurbitaceous vine; it is the balsam-apple, an abundant tropical weed. The family contains about 90 genera and 650 species, mainly natives of warm regions; five genera are represented in the United States.

Family Campanulaceae. Bell-flower Family. These are herbs, shrubs or trees, with an acrid, milky juice and perfect flowers. Calyx adherent to the ovary; corolla gamopetalous, regular or very irregular, 5-lobed. Stamens 5; filaments sometimes united: ovary 2–5-celled or 1-celled, becoming in fruit a capsule or a berry. The family contains about 60 genera and 1500 species, of very wide distribution. *Campanula*, the bell-flower, is distinctive of cold regions, its 250 species being confined to the northern hemisphere. In it the flowers are of the regular type, usually blue or purple, and very showy in some garden varieties. (Fig. 217.) The Venus' looking-glass *(Legouzia perfoliata)* is a common

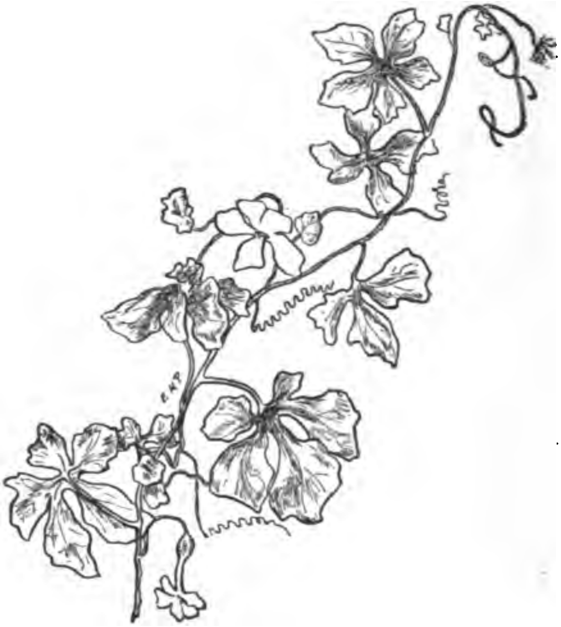

FIG. 216. The balsam-apple (*Momordica charantia*). One-half natural size. Original.

weed of old fields, and is remarkable for producing, like the violets, cleistogamous flowers, which are fertilized in the bud and never open.

Another division of the family is represented by *Lobelia,* of which there are 225 species. In this group the flowers are irregular, being 2-lipped, with the lips variously cleft. The anthers are united into a tube or ring around the style. There are many tropical allies of *Lobelia,* but the greatest number occur in the Hawaiian islands, and many are endemic there: Our native Lobelias are superior in beauty to those in cultivation; important among these are the cardinal-flower and the great blue lobelia (Fig. 218).

Family Cichoriaceae. Chicory Family. Contains about 65 genera and 1400 species, of wide distribution. They are almost all herbs, with milky juice and alternate or basal leaves. The flowers are borne in heads subtended by an involucre as above described. The flowers are all similar and perfect, the calyx-tube completely adherent to the ovary, the spreading upper portion (known as the *pappus*), consisting of scales or bristles or sometimes wanting. The corolla is gamopetalous, its limb ex-

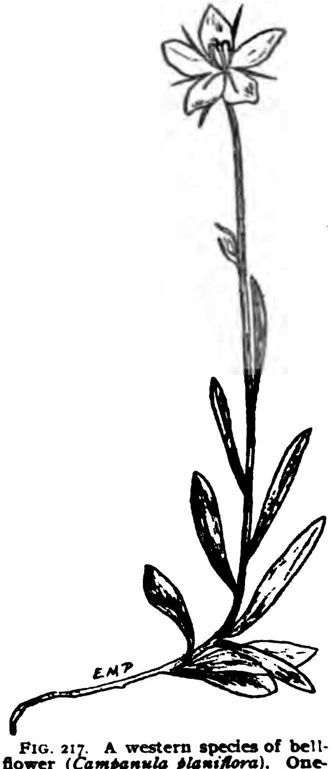

FIG. 217. A western species of bell-flower (*Campanula planiflora*). One-half natural size. Original.

panded into a flat strap-shaped or *ligulate* portion known as a ray; the rays make up the conspicuous portion of the flower, and are what seem to be petals. Anthers united into a tube around the style, the anther sacs appendaged at the base and summit. Style slender and 2-cleft. Ovary 1-celled, with a single ovule, becoming a small seed-like fruit known as an achene. Fig. 219, representing the flower of the dandelion, will serve to make this more clear.

There are many different types of plants among the Cichoriaceae. Some few afford garden vegetables, as the salsify (*Tragopogon*) and the lettuce (*Lactuca*), while the chicory (*Cichorium*) is widely known as an adulterant for coffee. The leaves of the common dandelion are highly esteemed as boiled "greens." Many

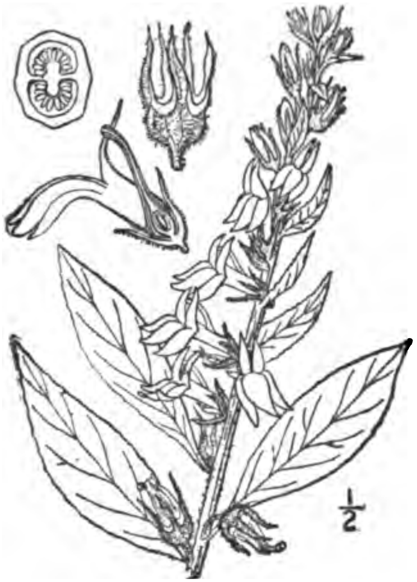

FIG. 218. The great blue lobelia (*Lobelia syphilitica*,) After Britton and Brown, Ill. Fl. Northeast. U. S.

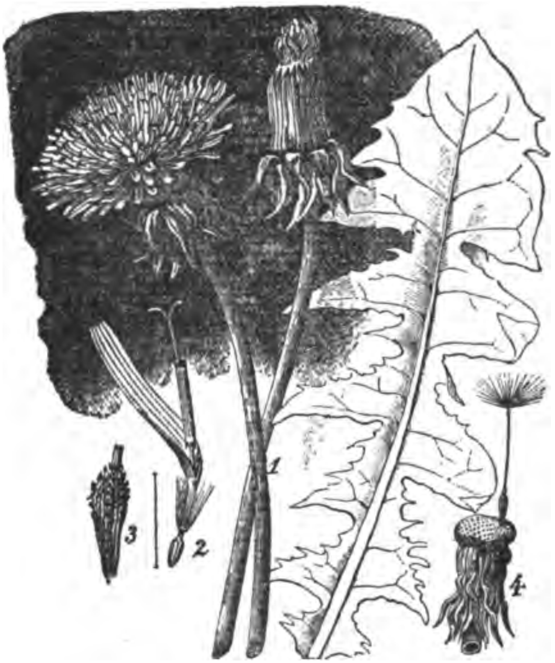

FIG. 219. The common dandelion: 1, two flower stalks; in one the head is closed, showing the double involucre, the inner erect, the outer reflexed; in the other the head open, showing that all the flowers are strap-shaped; 2, a single flower showing inferior ovary, pappus, corolla, stamen tube, and two-parted style; 3, a mature achene; 4, a head from which all but one of the achenes have been removed, showing the pitted receptacle and the prominent pappus beak.—After Strasburger. From Coulter's Plant Structure, by courtesy of D. Appleton & Co.

of the plants are troublesome weeds. Thus the genus *Hieracium* or hawkweed, represented in this country by about 30 species, none of which are very troublesome, embraces no fewer than 250 species of the Old World; and of these the king-devil (*H. praealtum*) and the orange hawkweed (*H. aurantiacum*) have become serious pests to the farmers in many parts of New England and New York. In Maryland and the District of Columbia another European immigrant has become troublesome, the gum succory (*Chondrilla juncea*).

The ray flowers of the Chicory family are for the most part yellow, but the chicory itself has blue flowers, and there are other genera with white, pink and red rays.

Family Ambrosiaceae. Ragweed Family. In this group the same floral structure prevails, except that the plants are monoecious or dioecious, and the pistillate head of flowers is frequently larger and nut-like or bur-like in appearance. The corolla is reduced to a mere ring or tube in the pistillate flowers; in the staminate it is tubular and 4–5-lobed; there is no flat or expanded portion corresponding to the rays of the Cichoriaceae. The ovary is inferior. There are 8 genera and about 55 species, largely American. The great bulk of them are pestilential weeds, of which the ragweed (*Ambrosia artemisiaefolia*) may be taken as typical. (Fig. 220.) This plant, with its habit of overrunning every bit of waste land to the exclusion of all other plants, would be sufficiently disagreeable under any circumstances; but when we reflect that it is a disturbing factor, if not a primary cause, of the disease knows as hay fever, it must be accounted a vegetable pariah, to be combated and uprooted wherever it occurs. The cocklebur (*Xanthium*) is also troublesome on account of the propensity of its prickly burs to adhere to everything with which they come in contact (Fig. 221).

Family Compositae. Thistle or Composite Family. This family is the largest in the whole series of flowering plants, of which it comprises about eight or nine per cent. The genera are estimated at 775, the species at 10,000, and the family is distributed over all parts of the world, though as a rule less abundant in tropical than in temperate regions.

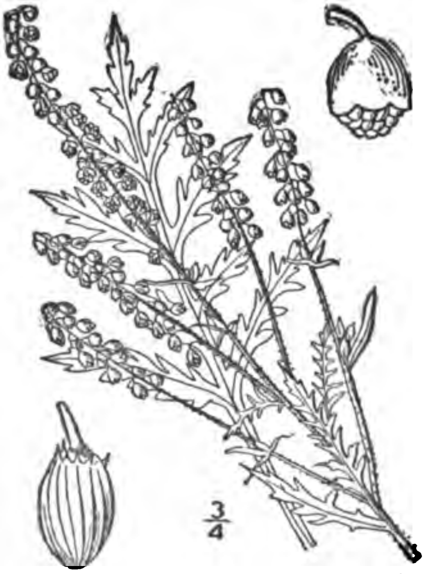

Fig. 220. Ragweed (*Ambrosia artemisiaefolia*). After Britton and Brown, Ill. Fl. Northeast. U.S.

The first two tribes in the family consist of the iron-weeds (*Vernonia*), the bonesets (*Eupatorium*) and their relatives. They contain nearly 1,000 species, dispersed throughout temperate and tropical climates. A good example is furnished by the common native boneset (*Eupatorium perfoliatum*), which furnished the thoroughwort tea of our childhood days. (Fig. 222.) The tribe Astereae contains two of our largest and most familiar North American genera, *Aster* and *Solidago*. They are the most ornamental of our fall blooming wild flowers, and there is great diversity among the species. (Fig. 223.) Here also belong the various species of *Baccharis*, the only shrubby composite in eastern North America. The Inuleae contain the majority of the so-called "everlastings," the flower-heads of which are dry and chaffy in texture, so that they keep in good condition for a long time. The edelweiss belongs to this tribe, as also the cudweeds and wild everlastings of our meadows The "Rose-of-Jericho" is a species of *Odontospermum* inhabiting the desert of Sahara.

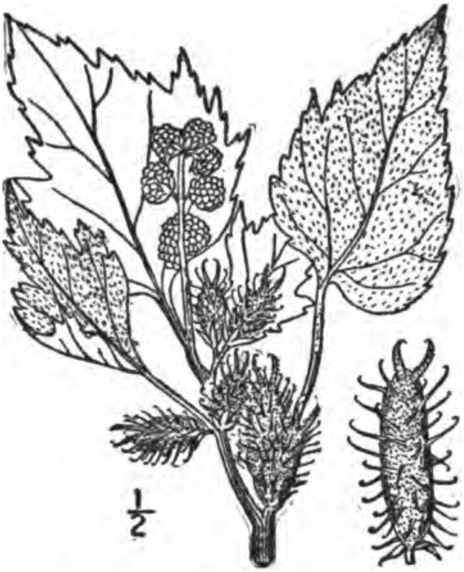

FIG. 221. The cocklebur (*Xanthium Canadense*). After Britton and Brown, Ill. Fl. Northeast. U. S.

The Heliantheae include some of our more showy-flowered composites, such as the sunflowers (*Helianthus)*, of which there are many North American species, and the *Rudbeckias*, *Coreopsis* and *Bidens*. The garden marigolds (*Tagetes)* are closely related. (Figs. 224 and 225.) In the Anthemideae belong several of our rank weeds, like the iil-scented mayweed and the ox-eye daisy, also the chrysanthemum, which in its cultivated form has been developed from species with only a single row of rays; the wormwoods and sagebrushes (*Artemisia)* and the feverfew (*Pyrethrum)*. A species of the latter genus yields buhach, or Persian insect powder. The Senecioneae contain the huge genus *Senecio* and the garden cinerarias, while the final tribe we shall mention, the Cynareae, comprises all the thistles and thistle-like plants distributed through various genera, of which *Carduus, Centaurea* and *Arctium* (the burdock) are the principal ones. (Fig. 226.)

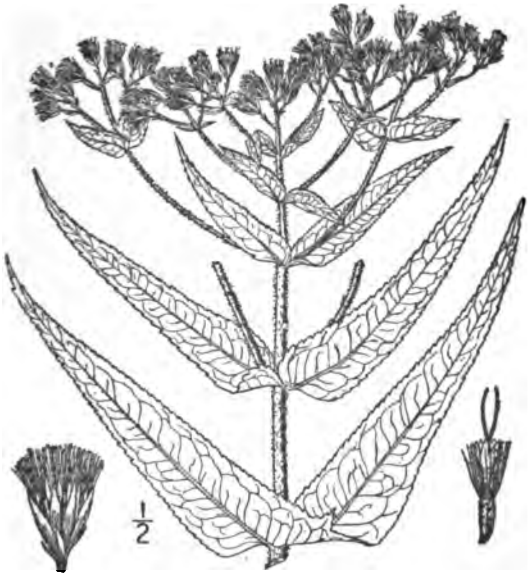

FIG. 222. Boneset (*Eupatorium perfoliatum*). After Britton and Brown, Ill. Fl. Northeast. U. S.

All the Compositae agree in having the same general structure as the Cichoriaceae: that is, the flowers are aggregated in an involucrate head; but there is this difference, that in the Compositae proper only part of the flowers have strap-shaped corollas, the others being tubular and inconspicuous, like those in the "center" of a so-called daisy flower. In some tribes, indeed, the flowers are all tubular. On an examination of any Composite we can readily understand why this family illustrates the highest development among flowering plants, on the theory that separation of parts is an indication of primitive structure. For here the anthers and filaments are united into a column; the corolla forms a tube; the calyx is in such intimate adherence to the ovary that it may be said to have disappeared; the ovary is one-seeded: the flowers are aggregated in a close head; and the floral bracts are crowded into a calyx-like involucre.

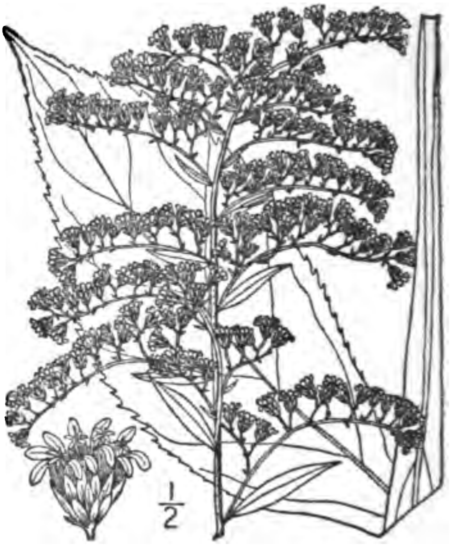

FIG. 223. A native species of golden-rod (*Solidago juncea*). After Britton and Brown, Ill. Fl. Northeast. U. S.

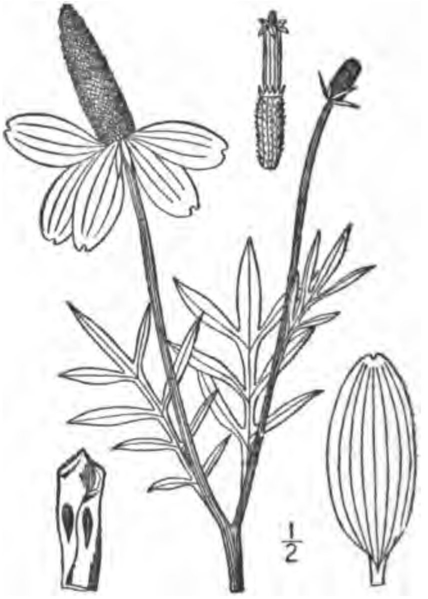

FIG. 224. A western composite allied to the "black-eyed Susan" (*Ratibida columnaris*). After Britton and Brown, Ill. Fl. Northeast. U. S.

And thus, having found our way through the maze of plant families, we are ready to recognize the beautiful natural relationships to be found in botany as in other branches of biology. If these somewhat discursive papers have proved serviceable in making the flowering-plant relationships more clear, the author feels that his work has fulfilled its mission.

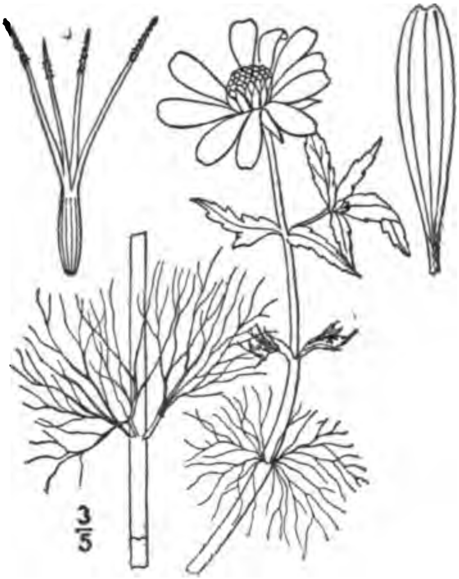

FIG. 225. The water marigold, an aquatic *Bidens* (*B. Beckii*). After Britton and Brown, Ill. Fl. Northeast. U. S.

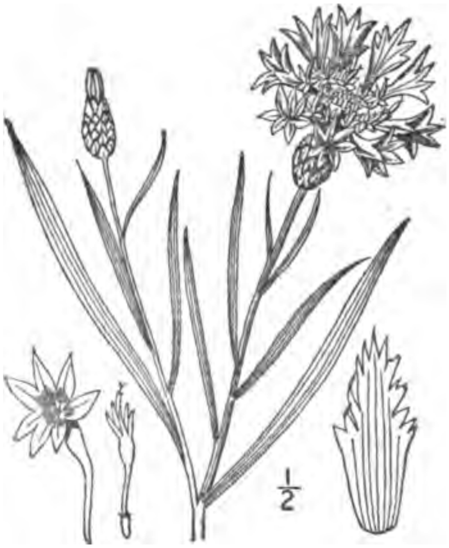

FIG. 226. Bachelor's-button (*Centaurea Cyanus*). After Britton and Brown, Ill. Fl. Northeast. U. S.

THE END.

THE FAMILIES

— OF —

FLOWERING PLANTS.

BY

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SUPPLEMENT

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